SBC81205 Series
Intel® Core™ 2 Quad/Core™ 2 Duo/ Celeron® D
PICMG 1.0 Single Board Computer
User's Manual

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CAUTION

If you replace wrong batteries, it causes the danger of explosion. It is recommended by the manufacturer that you follow the manufacturer's instructions to only replace the same or equivalent type of battery, and dispose of used ones.

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ESD Precautions

Computer boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please take care of the following jobs with precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before holding the board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. It discharges static electricity from your body.
- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

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Table of Contents

Disclaimers ii
ESD Precautions iii

C h a p t e r 1 Intriduction 1
1.1 Specifications 2
1.2 Utilities Supported 3
1.3 I/O Bracket 4

C h a p t e r 2 Jumpers and Connectors 5
2.1 Board Layout 5
2.2 Jumper Settings 6
2.2.1 COM2 Mode Select Jumpers (JP1, JP2, JP3) 6
2.2.2 CMOS Clear Jumper (JP5) 7
2.2.3 ATX Auto Power On/Off (JP7) 7
2.3 Connectors 8
2.3.1 Print Port Connector (PRN1) 9
2.3.2 Serial Port Interface Connectors (COM1, COM2) 10
2.3.3 ATX 4 Pin 12V In Connector (CN4) 10
2.3.4 Floppy Disk Port Connector (FDD1) 11
2.3.5 SATA Connectors (SATA1~4) 12
2.3.6 USB Connectors (USB3~4) 12
2.3.7 Front Panel Connector (CN1) 13
2.3.8 AXIOM ACPI Connector (CN2) 14
2.3.9 Internal Mouse/Keyboard Connector (MS1/KB1) 14
2.3.10 Intel® HD Audio Digital Header (HDA1) 15

C h a p t e r 3 Hardware Instakkation 16
3.1 Installing the Processor 16
3.2 Installing the Memory 21

C h a p t e r 4 Hardware Description 22
4.1 Microprocessors 22
4.2 BIOS 22
4.3 System Memory 22
4.4 I/O Port Address Map 23

C h a p t e r 5 Phoenix-Award BIOS Utility 24
5.1 Entering Setup 24
5.2 Control Keys 25
5.3 Getting Help 25
5.4 The Main Menu 26
5.5 Standard CMOS Setup Menu 27
5.6 Advanced BIOS Features 30

5.7 Advanced Chipset Features 35
5.8 Integrated Peripherals 37
5.9 Power Management Setup 41
5.10 PnP/PCI Configuration Setup 44
5.11 PC Health Status 46
5.12 Frequency/Voltage Control 47
5.13 Load Optimized Defaults 48
5.14 Set Supervisor/User Password 49
5.15 Save & Exit Setup 50
5.16 Exit Without Saving 51

Chapter 6 Installation of Drivers 52
6.1 Installing Chipset Driver 52
6.2 Installing VGA Driver 55
6.3 Installing LAN Driver 59

Appendix A Watchdog Timer 62
Watchdog Timer Setting 62
Using the Watchdog Function 62

Appendix B PCI IRQ Rounting 64

Appendix C Configuring SATA for RAID Function 66

Appendix D Memory I/O Address 77

MEMO

Chapter 1
Introduction

The SBC81205 PICMG 1.0 full-size Single Board Computer supports Intel® Core™ 2 Quad, Core™ 2 Duoand Celeron® D processors, at FSB 800/1066/1333 MHz. The board integrates chipsets Intel® Q35 and ICH9/ICH9R that deliver outstanding system performance through high-bandwidth interfaces, multiple I/O functions for interactive applications and various embedded computing solutions. There are two DDR2 DIMM sockets for dual channel DDR2 533/667/800, maximum memory capacity up to 4GB. The board also features dual gigabit Ethernet, four serial ATA channels for four serial ATA hard drives at maximum transfer rate up to 3 Gb/sec, six USB 2.0 high speed compliant that can achieve the best stability and reliability for industrial applications.

1.1 Specifications

- **CPU: Intel® Core™ 2 Quad, Core™ 2 Duoand Celeron® D processors**
- **System Chipset: Intel® Q35 & ICH9/ICH9R**
- **CPU Socket: LGA775**
- **Front-Side Bus: 800/1066/1333 MHz**
- **BIOS**
  - Phoenix-Award PnP Flash BIOS
- **System Memory**
  - Two x 240-pin DDR2 DIMM sockets
  - Maximum up to 4GB DDR2 memory
  - Support DDR2 533/667/800 memory
- **L2 Cache:** integrated in CPU
- **Onboard Multi-I/O**
  - Parallel Port: one bi-directional with ECP/EPP/SPP support
  - Serial Port: one for RS-232 (COM1) and one port for RS-232/422/485 (COM2)
  - Floppy controller: supports two drives (1.44MB for each)
- **USB Interface**
  - Six USB ports compliant with USB Spec. Rev. 2.0
- **VGA Controller**
  - Chipset Integrated VGA Controller and Supports up to 2048x1536 at 75 Hz resolution on non-interlaced CRT monitors
- **Ethernet**
  - The LAN1/LAN2: dual Realtek RTL8111B gigabit Ethernet controller
  - Via PCI Express x1 bus
  - Wake-on-LAN support
- **Serial ATA**
  - Built-in four SATA/SATA II ports onboard support the maximum transfer rate up to 3 Gb/sec

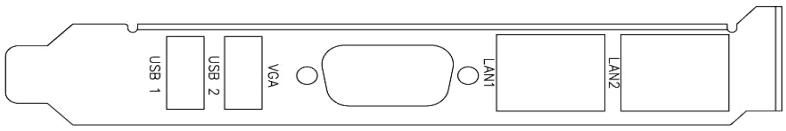
- **Audio**
  - HD audio interface for external kit AX93242
- **Hardware Monitoring**
  - Controller: Winbond W83627DHG detection of CPU temperature, system temperature, power failure and fan speed
- **Watchdog Timer**
  - Software programmable time interval and hardware reset only.
  - 1~255 seconds; up to 255 levels
- **Dimensions:** 338 x 126 mm (6 layer)

NOTE *All specifications and images are subject to change without notice.*

1.2 Utilities Supported

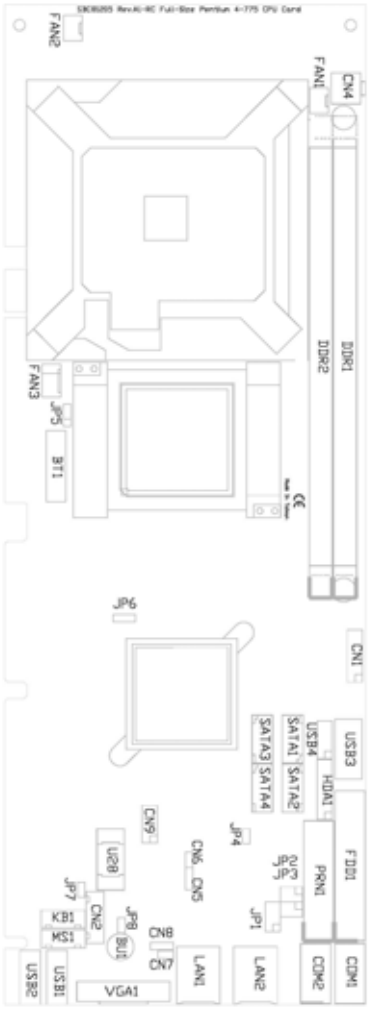
- Intel® Q35 Utility and Drivers
- VGA Drivers
- Ethernet Utility and Drivers
- Audio Driver

1.3 I/O Bracket



Chapter 2
Jumpers and Connectors

2.1 Board Layout

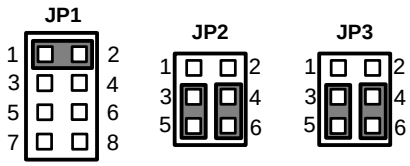
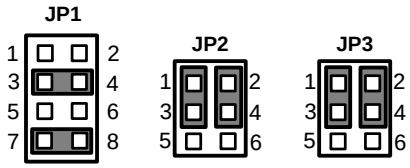
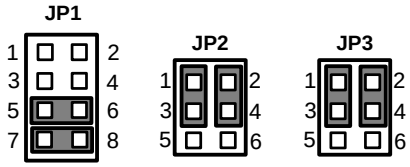


2.2 Jumper Settings

Proper jumer settings configure the **SBC81205** to meet your application purpose.

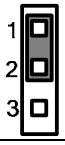
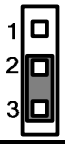
2.2.1 COM2 Mode Select Jumpers (JP1, JP2, JP3)

These jumpers select the COM2 port's communication mode to operate RS-232 or RS-422/485.

Description	Function	Jumper Setting
COM2	RS-232 (Default)	
	RS-422	
	RS-485	

2.2.2 CMOS Clear Jumper (JP5)

You may need to use this jumper is to clear the CMOS memory if incorrect BIOS settings.

Description	Function	Jumper Setting
CMOS Clear	Normal (Default)	JP5 
	Clear CMOS	JP5 

2.2.3 ATX Auto Power On/Off (JP7)

When Jumper JP7 is set OPEN for AC power input, the system will be automatically power ON without pressing soft power button; when JP7 is SHORT for AC power input, it is necessary to manually press soft power button to make the system power ON.

Note *This function is similar to the feature of Power On after Power Failed, which is controlled by hardware circuitry instead of BIOS.*

2.3 Connectors

Connectors connect the CPU card with other parts of the system. Loose or improper connection might cause problems. Make sure all connectors are properly and firmly connected.

Here is a summary table shows you all connectors on the board.

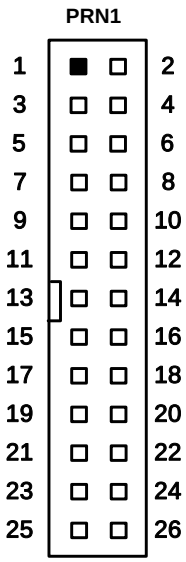
Connectors	Label	Connectors	Label
FRONT PANEL CONNECTOR	CN1	USB 1 CONNECTOR	USB1
AXIOM ACPI CONNECTOR	CN2	USB 2 CONNECTOR	USB2
ATX 4 PIN 12V IN CONNECTOR	CN4	USB 3, 4 CONNECTOR	USB3
LAN2 Ext. Speed LED	CN5	USB 5,6 CONNECTOR	USB4
LAN2 Ext. Link/ACT LED	CN6	SYSTEM FAN1 CONNECTOR	FAN1
LAN1 Ext. Speed LED	CN8	SYSTEM FAN2 CONNECTOR	FAN2
LAN1 Ext. Link/ACT LED	CN7	CPU FAN CONNECTOR	FAN3
RJ-45 PORT 1	LAN1	COM1 PORT	COM1
RJ-45 PORT 2	LAN2	COM2 PORT	COM2
LGA775 SOCKET	CPU1	MOUSE CONNECTOR	MS1
S-ATA PORT 1	SATA1	KEYBOARD CONNECTOR	KB1
S-ATA PORT 2	SATA2	VAG PORT	VGA1
S-ATA PORT 3	SATA3	PARALLEL PORT	PRN1
S-ATA PORT 4	SATA4	FLOPPY PORT	FDD1
Intel® HD Audio Digital Header	HDA1		

2.3.1 Print Port Connector (PRN1)

Print Port Connector [Default]
This board has a multi-mode parallel port to support:

1. **Standard Mode:**
   IBM PC/XT, PC/AT and PS/2™ are compatible with bi-directional parallel port.
2. **Enhanced Mode:**
   Enhance parallel port (EPP) is compatible with EPP 1.7 and EPP 1.9 (IEEE 1284 compliant).
3. **High Speed Mode:**
   Microsoft and Hewlett Packard extended capabilities port (ECP) is IEEE 1284 compliant.

Pin	Signal	Pin	Signal
1	Strobe#	2	Data 0
3	Data 1	4	Data 2
5	Data 3	6	Data 4
7	Data 5	8	Data 6
9	Data 7	10	Acknowledge #
11	Busy	12	Paper Empty #
13	Printer Select	14	Auto Form Feed #
15	Error #	16	Initialize #
17	Printer Select In #	18	GND
19	GND	20	GND
21	GND	22	GND
23	GND	24	GND
25	GND	26	

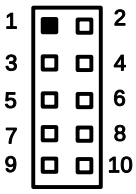


2.3.2 Serial Port Interface Connectors (COM1, COM2)

The serial interface for the board consists of COM1 port (COM1) and COM2 (COM2) supports RS-232/RS-422/RS-485.

Pin	Signal	Pin	Signal
1	Data Carrier Detect (DCD)	2	Data Set Ready (DSR)
3	Receive Data (RXD)	4	Request to Send (RTS)
5	Transmit Data (TXD)	6	Clear to Send (CTS)
7	Data Terminal Ready (DTR)	8	Ring Indicator (RI)
9	Ground (GND)	10	NC

COM1, COM2



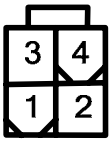
2.3.3 ATX 4 Pin 12V In Connector (CN4)

You can connect it to the ATX12V power supply for CPU Core Voltage.

Note: *Make sure your ATX12V power supply can provide 16A on the +12V lead and at least 1A on the +5V standby lead (+5VSB). The minimum recommended wattage is 250W or 300W for a fully configured system. The system may become unstable and may experience difficulty powering up if the power supply is inadequate.*

Pin	Signal
1	GND
2	GND
3	+12V
4	+12V

CN4

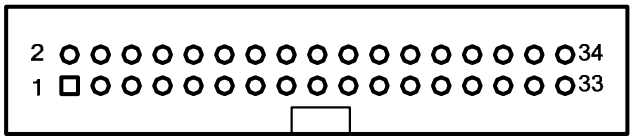


2.3.4 Floppy Disk Port Connector (FDD1)

The board provides a 34-pin header type connector, FDD1, supporting up to two floppy drives. The floppy drives may be any one of the following types: 5.25" 360KB/1.2MB and 3.5" 720KB/1.44MB/2.88MB.

Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	Reduce write current	3	GND
4	N/C	5	GND	6	N/C
7	GND	8	Index #	9	GND
10	Motor enable A #	11	GND	12	Drive select B #
13	GND	14	Drive select A #	15	GND
16	Motor enable B #	17	GND	18	Direction #
19	GND	20	STEP #	21	GND
22	Write data #	23	GND	24	Write gate #
25	GND	26	Track #	27	GND
28	Write protect #	29	GND	30	Read data #
31	GND	32	Side 1 select #	33	GND
34	Disk change #				

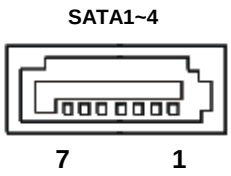
FDD1



2.3.5 SATA Connectors (SATA1~4)

These SATA connectors are for high-speed SATA interface ports and they can be connected to hard disk devices.

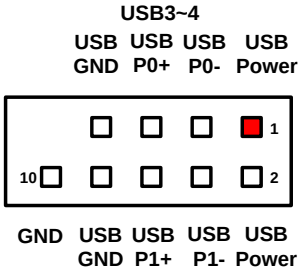
Pin	Signal
1	GND
2	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	SATA_RX+
7	GND



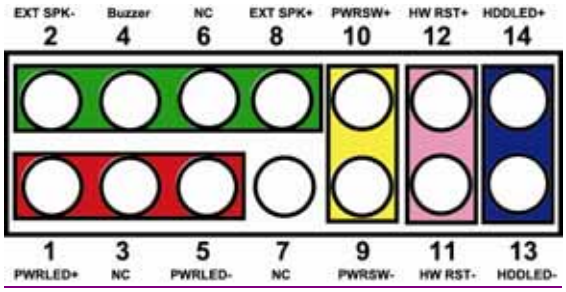
2.3.6 USB Connectors (USB3~4)

These Universal Serial Bus (USB) connectors on this board are for installing versatile USB interface peripherals. These are 10-pin standard USB connectors.

Pin	Signal	Pin	Signal
1	USB POWER	2	USB POWER
3	USB P0-	4	USB P1-
5	USB P0+	6	USB P1+
7	USB GND	8	USB GND
9	NC	10	GND



2.3.7 Front Panel Connector (CN1)



- **Power LED**

  Pins 1, 3, 5 connect the system power LED indicator to its respective switch on the case. Pin 1 is +, and pin 5 assigned to -. Pin 3 is defined as NC.

- **External Speaker and Internal Buzzer Connector**

  Pins 2, 4, 6, 8 can be connected to the case-mounted speaker unit or internal buzzer.

- **Hardware Reset**
  Pins 11 and 12 are designed for Hardware Rese*t*.

- **HDD Activity LED**
  This connector extends to the hard drive activity LED on the control panel. This LED will flash when the HDD is being accessed. Pins 13 and 14 can be connected to the hard disk drive and front panel HDD LED.

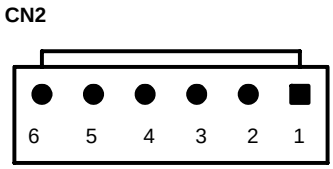
- **Power Button**

  Pins 9 and 10 connect the front panel's ATX power button to the card, which allows users to control ATX power on or off.

2.3.8 AXIOM ACPI Connector (CN2)

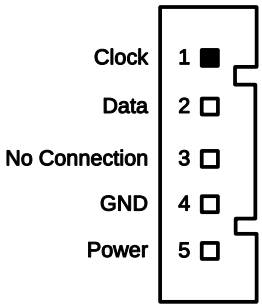
It is to support remote power on/off for turning off the system through software control while using the ATX-compliant power supply.

Pin	Signal	Pin	Signal
1	EXTSMI	2	GND
3	POWER BUTTOM	4	GND
5	SUSB	6	+5VSB



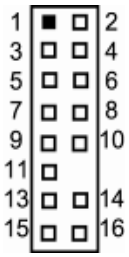
2.3.9 Internal Mouse/Keyboard Connector (MS1/KB1)

The board provides a keyboard (KB1) and Mouse (MS1) interface with two 5-pin connectors.



2.3.10 Intel® HD Audio Digital Header (HDA1)

Pin	Signal	Pin	Signal
1	BCLK	2	GND
3	RST#	4	VCC3
5	SYNC	6	GND
7	SDOUT	8	VCC3
9	SDI0	10	+12V
11	No connector		
13	No connector	14	3VDUAL
15	No connector	16	GND

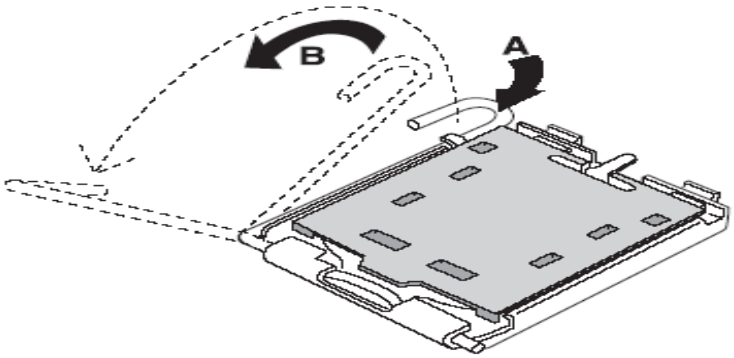


Chapter 3
Hardware Installation

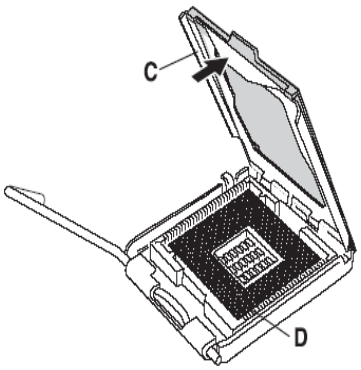
Before installing the processor, please access Intel® website for more detailed information http://www.intel.com .

3.1 Installing the Processor

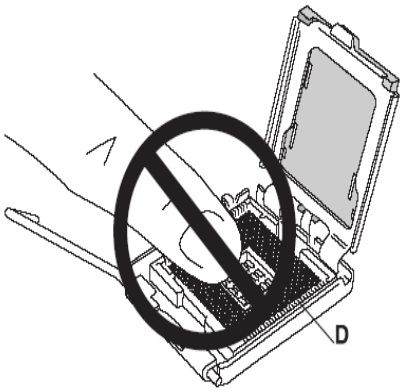
The LGA775 processor socket comes with a cover to protect the processor. Please install the processor into the CPU socket step by step as below:



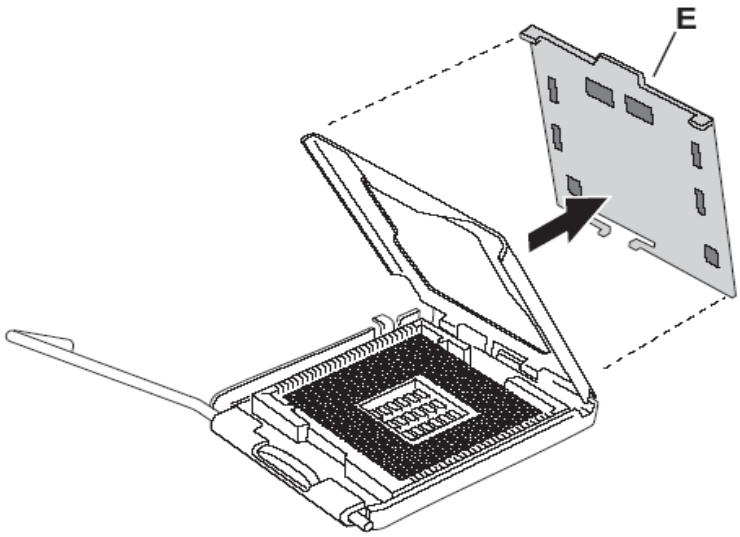
Hold the hook (A) of the lever and push it down.
Pull the lever (B) asisde to unlock the cover.



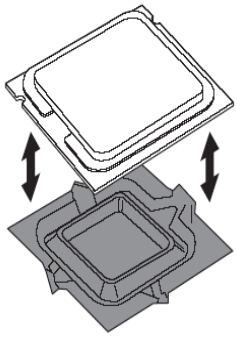
Open the cover (C), you can see the contact.

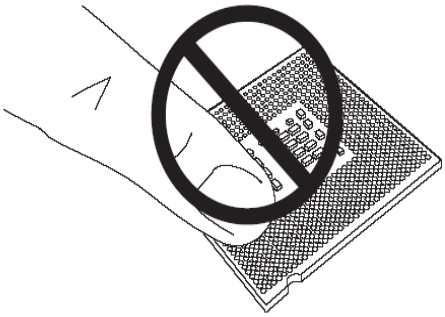


Be careful not to touch the contact (D).

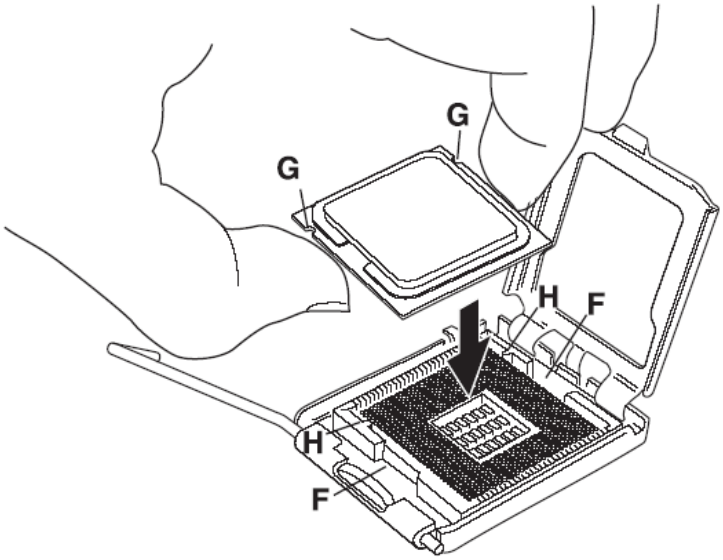


Remove the plastic cap (E) from the cover.

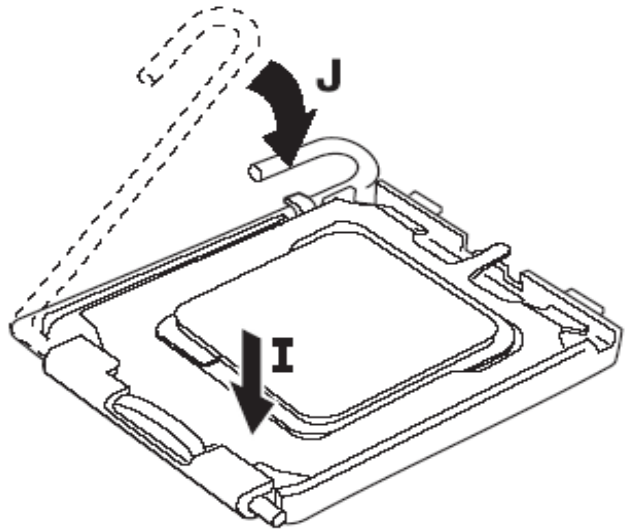




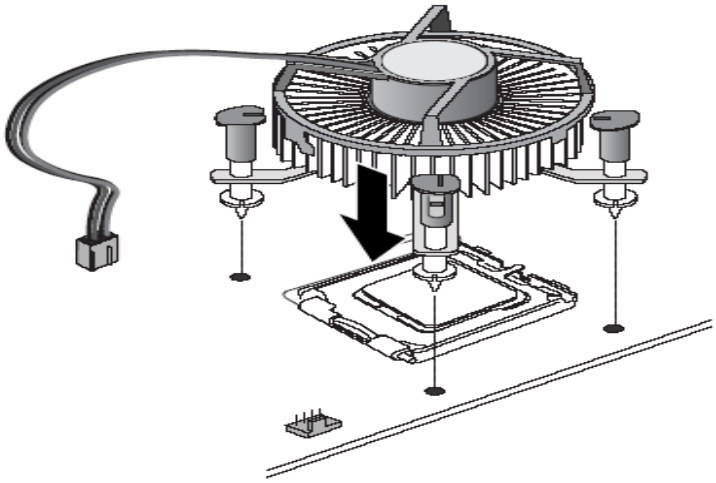
Place the CPU down into the socket. Be careful not to touch the contact.



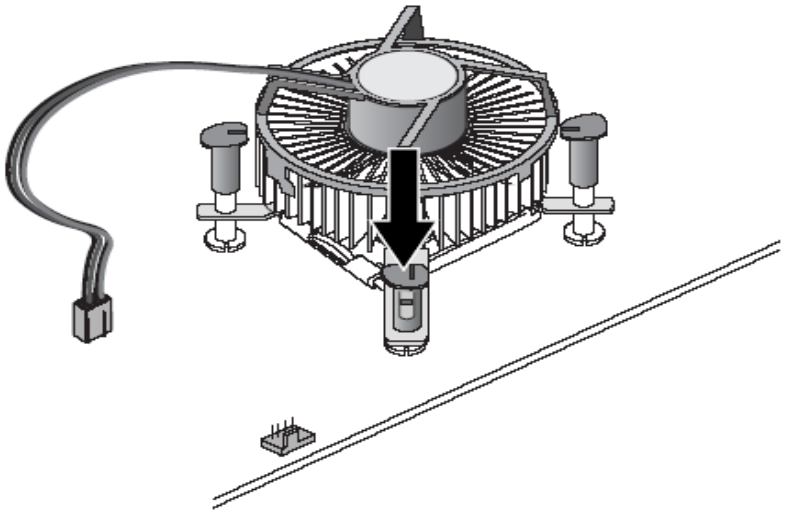
Hold the edges of the CPU, and orientate it as the marked direction (G) down into the socket to match the (H) and (F) locations.



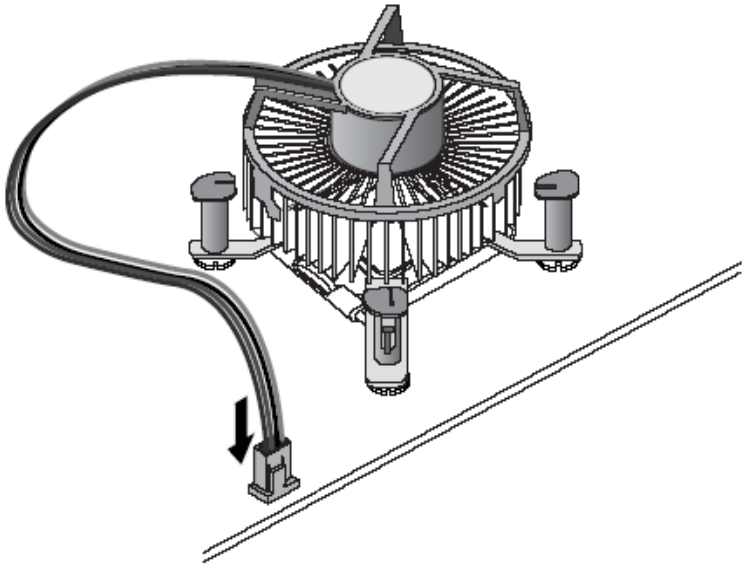
Slightly push down the cover and hook the lever (I~J). The CPU is completely locked.



Orientate the CPU cooling fan to fixing holes on the board.



Screw the CPU cooling fan onto the board.



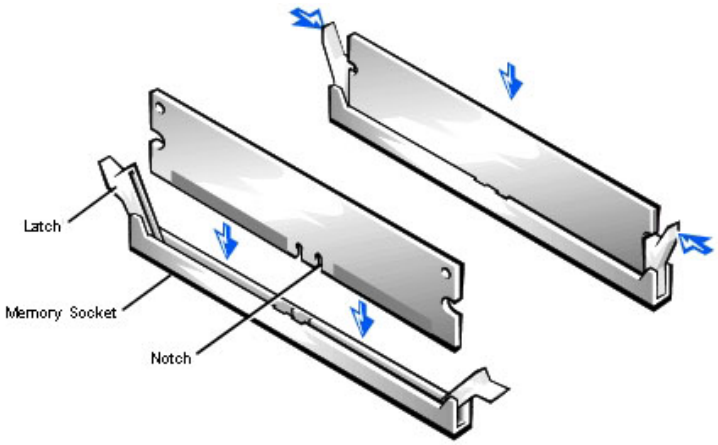
Make sure the CPU fan is plugged to the CPU fan connector.

3.2 Installing the Memory

The board supports two 240-pin DDR2 DIMM memory sockets with maximum memory capacity up to 4 GB.

Please follow steps below to install the memory modules:

1 Push down latches on each side of the DIMM socket.
2 Align the memory module with the socket that notches of memory module must match the socket keys for a correct intallation.
3 Install the memory module into the socket and push it firmly down until it is fully seated. The socket latches are levered upwards and clipped on to the edges of the DIMM.
4 Install any remaining DIMM modules.



Chapter 4
Hardware Description

4.1 Microprocessors

The SBC81205 Series supports Intel® Core™ 2 Quad, Core™2 Duoand Celeron® D processors, which make your system operated under Windows® XP and Linux environments. The system performance depends on the microprocessor. Make sure your installed microprocessor with all correct settings that prevent the CPU from damages.

4.2 BIOS

The SBC81205 Series uses Phoenix-Award Plug and Play BIOS with a single 4Mbit Flash.

4.3 System Memory

The SBC81205 Series industrial CPU card supports two 240-pin DDR2 DIMM sockets for a maximum memory of 4 GB DDR2 SDRAMs. The memory module can come in sizes of 64 MB, 128 MB, 256 MB, 512 MB, 1 GB and 2 GB.

4.4 I/O Port Address Map

The Intel® Core™ 2 Quad, Core™ 2 Duo, Pentium® D, Pentium® 4 and Celeron® D CPUs can communicate via I/O ports. There are total 1KB port addresses available for assignment to other devices via I/O expansion cards.

Address	Devices
000-01F	DMA controller #1
020-03F	Interrupt controller #1
040-05F	Timer
060-06F	Keyboard controller
070-07F	Real time clock, NMI
080-09F	DMA page register
0A0-0BF	Interrupt controller #2
0F0	Clear math coprocessor busy signal
0C0-0DF	DMA controller #2
0F1	Reset math coprocessor
0F8-0FF	Math processor
120	Disable watchdog timer operation (read)
121	Enable watchdog timer operation (read)
122	Watchdog
1F0-1F8	Fixed disk controller
200-207	Game port
300-31F	Prototype card
360-36F	Reserved
378-37F	Parallel port #1
3B0-3BF	MDA video card (including LPT1)
3C0-3CF	EGA card
3D0-3DF	CGA card
3F0-3F7	Floppy disk controller
3F8-3FF	Serial port #1 (COM1)
2F8-2FF	Serial port #2 (COM2)

Chapter 5
Phoenix-Award BIOS Utility

The Phoenix-Award BIOS provides users with a built-in Setup program to modify basic system configuration. All configured parameters are stored in a battery-backed-up RAM (CMOS RAM) to save the Setup information whenever the power is turned off.

5.1 Entering Setup

There are two ways to enter the Setup program. You may either turn ON the computer and press <Del> immediately, or press the <Del> and/or <Ctrl>, <Alt>, and <Esc> keys simultaneously when the following message appears at the bottom of the screen during POST (Power on Self Test).

TO ENTER SETUP PRESS DEL KEY

If the message disappears before you respond and you still want to enter Setup, please restart the system to try it again. Turning the system power OFF and ON, pressing the "RESET" button on the system case or simultaneously pressing <Ctrl>, <Alt>, and <Del> keys can restart the system. If you do not press keys at the right time and the system doesn't boot, an error message will pop out to prompt you the following information:

PRESS <F1> TO CONTINUE, <CTRL-ALT-ESC> OR <DEL> TO ENTER SETUP

5.2 Control Keys

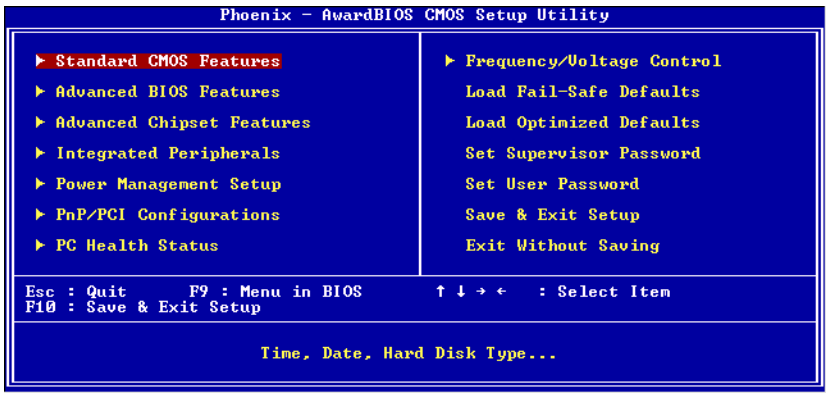
Up arrow	Move cursor to the previous item
Down arrow	Move cursor to the next item
Left arrow	Move cursor to the item on the left hand
Right arrow	Move to the item in the right hand
Esc key	Main Menu -- Quit and delete changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
PgUp/"+" key	Increase the numeric value or make changes
PgDn/"–" key	Decrease the numeric value or make changes
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
(Shift) F2 key	Change color from total 16 colors. F2 to select color forward, (Shift) F2 to select color backward
F3 key	Reserved
F4 key	Reserved
F5 key	Restore the previous CMOS value from CMOS, only for Option Page Setup Menu
F6 key	Load the default CMOS value from BIOS default table, only for Option Page Setup Menu
F7 key	Load the Setup default, only for Option Page Setup Menu
F8 key	Reserved
F9 key	Reserved
F10 key	Save all the CMOS changes, only for Main Menu

5.3 Getting Help

- **Main Menu**
  The online description of the highlighted setup function is displayed at the bottom of the screen.
- **Status Page Setup Menu/Option Page Setup Menu**
  Press <F1> to pop out a small Help window that provides the description of using appropriate keys and possible selections for highlighted items. Press <F1> or <Esc> to exit the Help Window.

5.4 The Main Menu

Once you enter the Phoenix-Award BIOS CMOS Setup Utility, the Main Menu appears on the screen. In the Main Menu, there are several Setup functions and a couple of Exit options for your selection. Use arrow keys to select the Setup Page you intend to configure then press <Enter> to accept or enter its sub-menu.

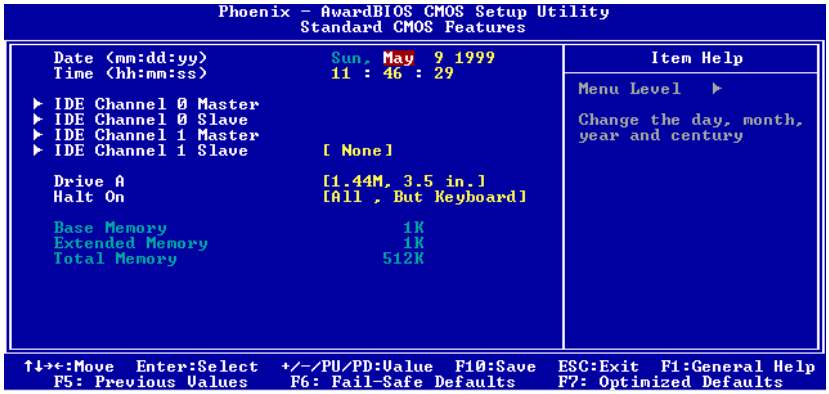


NOTE *If your computer can not boot after making and saving system changes with Setup, the Award BIOS will reset your system to the CMOS default settings via its built-in override feature.*

It is strongly recommended that you should avoid changing the chipset's defaults. Both Award and your system manufacturer have carefully set up these defaults that provide the best performance and reliability.

5.5 Standard CMOS Setup Menu

The Standard CMOS Setup Menu displays basic information about your system. Use arrow keys to highlight each item, and use <PgUp> or <PgDn> key to select the value you want in each item.


Phoenix - AwardBIOS CMOS Setup Utility
Standard CMOS Features
Date (mm:dd:yy) Sun, May 9 1999
Time (hh:mm:ss) 11 : 46 : 29
IDE Channel 0 Master
IDE Channel 0 Slave
IDE Channel 1 Master
IDE Channel 1 Slave [None]
Drive A [1.44M, 3.5 in.]
Halt On [All , But Keyboard]
Base Memory 1K
Extended Memory 1K
Total Memory 512K
Item Help
Menu Level ▶
Change the day, month, year and century
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

- **Date**
  The date format is <day>, <date> <month> <year>. Press <F3> to show the calendar.

day	It is determined by the BIOS and read only, from Sunday to Saturday.
date	It can be keyed with the numerical/ function key, from 1 to 31.
month	It is from January to December.
year	It shows the current year of BIOS.

- **Time**
  This item shows current time of your system with the format <hour> <minute> <second>. The time is calculated based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00.

- **IDE Channel 0 Master/IDE Channel 0 Slave/IDE Channel 1 Master/IDE Channel 1 Slave**
  These items identify the types of each IDE channel installed in the computer. There are 45 predefined types (Type 1 to Type 45) and 2 user's definable types (Type User) for Enhanced IDE BIOS. Press <PgUp>/<+> or <PgDn>/<–> to select a numbered hard disk type, or directly type the number and press <Enter>. Please be noted your drive's specifications must match the drive table. The hard disk will not work properly if you enter improper information. If your hard disk drive type does not match or is not listed, you can use Type User to manually define your own drive type.
  If selecting Type User, you will be asked to enter related information in the following items. Directly key in the information and press <Enter>. This information should be provided in the documentation from your hard disk vendor or the system manufacturer.
  If the HDD interface controller supports ESDI, select "Type 1".
  If the HDD interface controller supports SCSI, select "None".
  If the HDD interface controller supports CD-ROM, select "None".

CYLS.	number of cylinders	**LANDZONE**	landing zone
HEADS	number of heads	**SECTORS**	number of sectors
PRECOMP	write precom	**MODE**	HDD access mode

  If there is no hard disk drive installed, select NONE and press <Enter>.

- **Dive A type/Drive B type**
  This item identifies floppy disk type drive A or drive B installed in the computer.

None	No floppy drive installed
360K, 3.5 in	3.5 inch PC-type standard drive; 360Kb Mini ITXcity
1.2M, 3.5 in	3.5 inch AT-type high-density drive; 1.2MB Mini ITXcity
720K, 3.5 in	3.5 inch double-sided drive; 720Kb Mini ITXcity
1.44M, 3.5 in	3.5 inch double-sided drive; 1.44MB Mini ITXcity
2.88M, 3.5 in	3.5 inch double-sided drive; 2.88MB Mini ITXcity

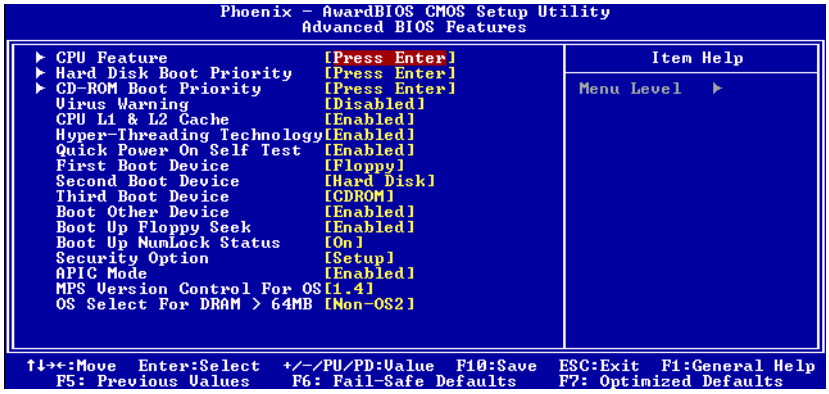
- **Halt On**
  This item determines whether the system will halt or not, if an error is detected while powering up.

No errors	The system booting will halt on any errors detected. (default)
All errors	Whenever BIOS detects a non-fatal error, the system will stop and you will be prompted.
All, But Keyboard	The system booting will not stop for a keyboard error; it will stop for other errors.
All, But Diskette	The system booting will not stop for a disk error; it will stop for other errors.
All, But Disk/Key	The system booting will not stop for a keyboard or disk error; it will stop for other errors.

Press <Esc> to return to the Main Menu page.

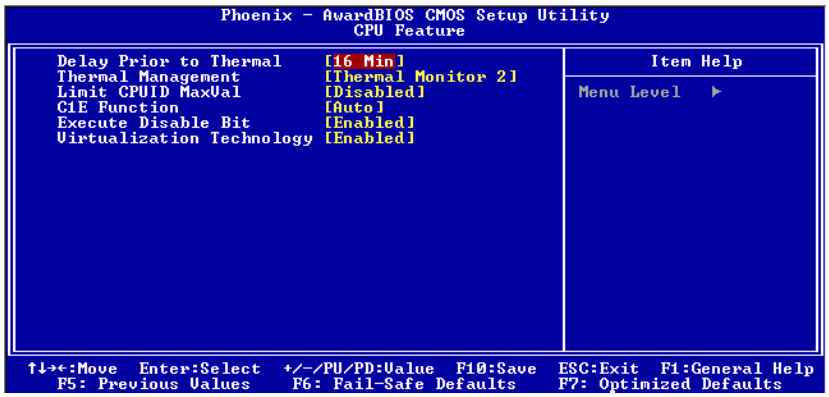
5.6 Advanced BIOS Features

This section allows you to configure and improve your system, to set up some system features according to your preference.


Phoenix - AwardBIOS CMOS Setup Utility
Advanced BIOS Features
CPU Feature [Press Enter]
Hard Disk Boot Priority [Press Enter]
CD-ROM Boot Priority [Press Enter]
Virus Warning [Disabled]
CPU L1 & L2 Cache [Enabled]
Hyper-Threading Technology [Enabled]
Quick Power On Self Test [Enabled]
First Boot Device [Floppy]
Second Boot Device [Hard Disk]
Third Boot Device [CDROM]
Boot Other Device [Enabled]
Boot Up Floppy Seek [Enabled]
Boot Up NumLock Status [On]
Security Option [Setup]
APIC Mode [Enabled]
MPS Version Control For OS [1.4]
OS Select For DRAM > 64MB [Non-OS2]
Item Help
Menu Level
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

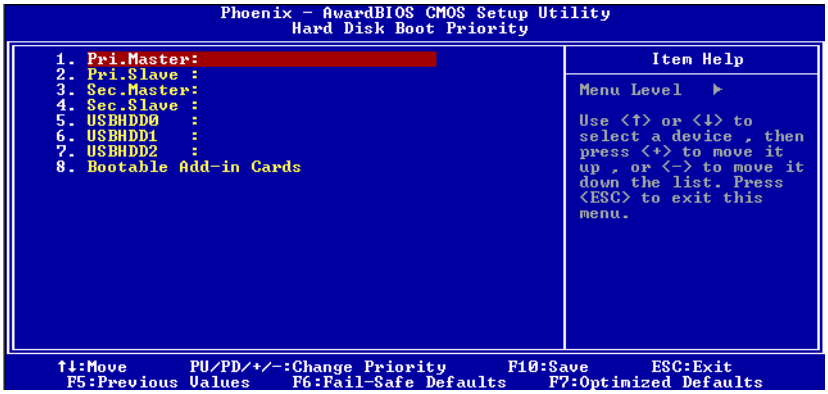
- **CPU Feature**

Scroll to this item and press <Enter> to view the CPU Feature sub menu.


Phoenix - AwardBIOS CMOS Setup Utility
CPU Feature
Delay Prior to Thermal [16 Min]
Thermal Management [Thermal Monitor 2]
Limit CPUID MaxVal [Disabled]
C1E Function [Auto]
Execute Disable Bit [Enabled]
Virtualization Technology [Enabled]
Item Help
Menu Level
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

- **Hard Disk Boot Priority**

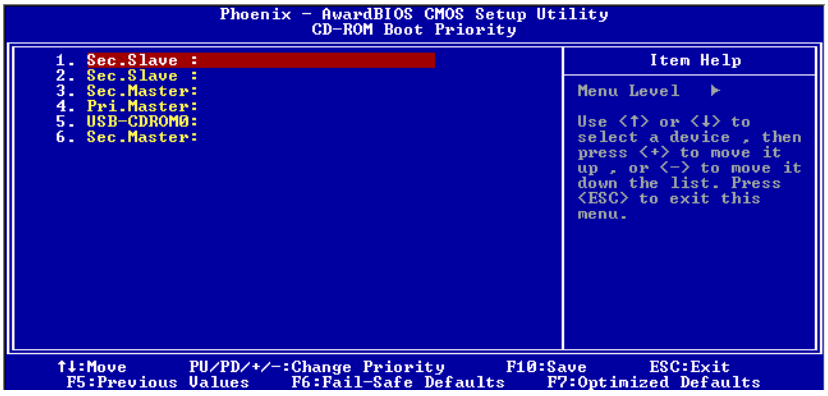
  Scroll to this item and press <Enter> to view the sub menu to decide the disk boot priority.


Phoenix - AwardBIOS CMOS Setup Utility
Hard Disk Boot Priority
1. Pri.Master:
2. Pri.Slave :
3. Sec.Master:
4. Sec.Slave :
5. USBHDD0 :
6. USBHDD1 :
7. USBHDD2 :
8. Bootable Add-in Cards
Item Help
Menu Level ▶
Use <↑> or <↓> to select a device , then press <+> to move it up , or <-> to move it down the list. Press <ESC> to exit this menu.
↑↓:Move PU/PD/+/-:Change Priority F10:Save ESC:Exit
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

Press <Esc> to return to the Advanced BIOS Features page.

- **CD-ROM Boot Priority**

  Scroll to this item and press <Enter> to view the sub menu to decide the CD-ROM boot priority.


Phoenix - AwardBIOS CMOS Setup Utility
CD-ROM Boot Priority
1. Sec.Slave :
2. Sec.Slave :
3. Sec.Master:
4. Pri.Master:
5. USB-CDROM0:
6. Sec.Master:
Item Help
Menu Level ▶
Use <↑> or <↓> to select a device , then press <+> to move it up , or <-> to move it down the list. Press <ESC> to exit this menu.
↑↓:Move PU/PD/+/-:Change Priority F10:Save ESC:Exit
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

Press <Esc> to return to the Advanced BIOS Features page.

- **Virus Warning**
  This option flashes on the screen. During and after the system boot up, any attempt to write to the boot sector or partition table of the hard disk drive will halt the system with the following message. You can run an anti-virus program to locate the problem. The default setting is "*Disabled*".

! WARNING !
Disk boot sector is to be modified *Type "Y" to accept write or "N" to abort write* *Award Software, Inc.*

Enabled	It automatically activates while the system boots up and a warning message appears for an attempt to access the boot sector or hard disk partition table.
Disabled	No warning message will appear for attempts to access the boot sector or hard disk partition table.

NOTE *This function is only available with DOS and other operating systems that do not trap INT13.*

- **CPU L1 & L2 Cache**
  These two options speed up memory access. However, it depends on the CPU/chipset design. The default setting is *"Enabled"*. CPUs without built-in internal cache will not provide the "CPU Internal Cache" item on the menu.

Enabled	Enable cache
Disabled	Disable cache

- **Hyper-Threading Technology**

  Use this item to enable or disable Hyper-Threading Technology, which makes a single physical processor perform multi-tasking function as two logical ones.

- **Quick Power On Self Test**
  This option speeds up Power on Self Test (POST) after you turn on the system power. If set as Enabled, BIOS will shorten or skip some check items during POST. The default setting is *"Enabled"*.

Enabled	Enable Quick POST
Disabled	Normal POST

- **First/Second/Third Boot Device**
  These items let you select the 1st, 2nd, and 3rd devices that the system will search for during its boot-up sequence. The wide range of selection includes Floppy, LS120, ZIP100, HDD0~3, SCSI, and CDROM.

- **Boot Other Device**

  This item allows the user to enable or disable the boot device not listed in the First/Second/Third boot devices option above. The default setting is "*Enabled"*.

- **Swap Floppy Drive**
  This item allows you to determine whether to enable Swap Floppy Drive or not. When enabled, the BIOS swap floppy drive assignment makes Drive A become Drive B, and vice versa. The default setting is "*Disabled".*

- **Boot Up Floppy Seek**
  During POST, BIOS will determine the floppy disk drive type, 40 or 80 tracks. The 360Kb type is 40 tracks while 720Kb, 1.2MB and 1.44MB are all 80 tracks. The default value is "*Enabled*".

Enabled	BIOS searches for floppy disk drive to determine if it is 40 or 80 tracks. Please be noted BIOS can not differentiate 720K, 1.2M or 1.44M drive type as they all are 80 tracks.
Disabled	BIOS will not search for the type of floppy disk drive by track number. There will be no warning message displayed if the installed drive is 360K.

- **Boot Up NumLock Status**
  Set the the Num Lock status when the system is powered on. The default value is *"On"*.

- **Security Option**
  This item allows you to limit access to the system and Setup, or just to Setup. The default value is *"Setup"*.

System	If a wrong password is entered at the prompt, the system will not boot, the access to Setup will be denied, either.
Setup	If a wrong password is entered at the prompt, the system will boot, but the access to Setup will be denied.

NOTE *To disable the security, select PASSWORD SETTING at Main Menu and then you will be asked to enter a password. Do not type anything, just press <Enter> and it will disable the security. Once the security is disabled, the system will boot and you can enter Setup freely.*

- **APIC Mode**
  Use this item to enable or disable APIC (Advanced Programmable Interrupt Controller) mode that provides symmetric multi-processing (SMP) for systems.

- **MPS Version Control For OS**
  This item specifies the version of the Multiprocessor Specification (MPS). Version 1.4 has extended configuration tables to improve support for multiple PCI bus configurations and provide future expandability.

- **OS Select For DRAM > 64MB**
  This item allows you to access the memory over 64MB in OS/2.

Press <Esc> to return to the Main Menu page.

5.7 Advanced Chipset Features

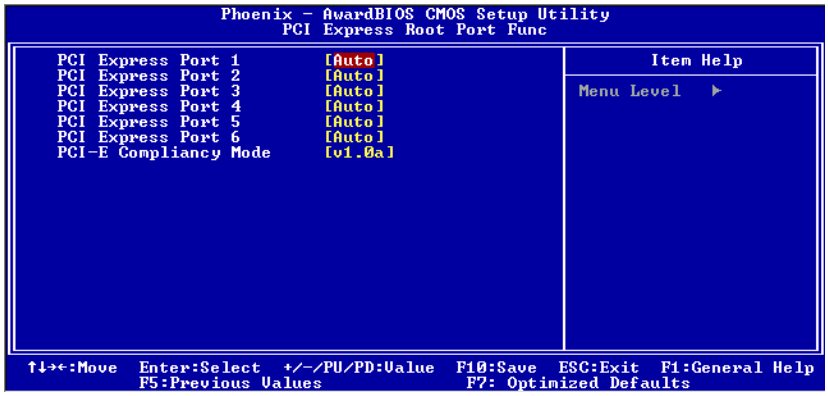
This section contains completely optimized chipset's features on the board that you are strongly recommended to leave all items on this page at their default values unless you are very familiar with the technical specifications of your system hardware.

Phoenix - AwardBIOS CMOS Setup Utility
Advanced Chipset Features
System BIOS Cacheable [Enabled]
Memory Hole At 15M-16M [Disabled]
PCI Express Root Port Func [Press Enter]
VT-d [Disabled]
** VGA Setting **
Onchip VGA Control [Enabled]
On-Chip Frame Buffer Size [8MB]
DVMT Mode [DVMT]
DVMT/FIXED Memory Size [128MB]
Item Help
Menu Level ▶
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

- **System BIOS Cacheable**
  Selecting Enabled allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result. The default value is *"Disabled"*.
- **Memory Hole At 15M-16M**
  Enabling this feature reserves 15MB to 16MB memory address space to ISA expansion cards that specifically require this setting. This makes the memory from 15MB and up unavailable to the system. Expansion cards can only access memory up to 16MB.

- **PCI Express Root Port Func.**

  Scroll to this item and press <Enter> to view the sub menu to decide the PCI Express Port.


Phoenix - AwardBIOS CMOS Setup Utility
PCI Express Root Port Func
PCI Express Port 1 [Auto]
PCI Express Port 2 [Auto]
PCI Express Port 3 [Auto]
PCI Express Port 4 [Auto]
PCI Express Port 5 [Auto]
PCI Express Port 6 [Auto]
PCI-E Compliancy Mode [v1.0a]
Item Help
Menu Level ▶
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F7: Optimized Defaults

Press <Esc> to return to the Advanced Chipset Features page.

**** VGA Setting ****

- **Onchip VGA Control**

  Use this item to choose the primary display card.

- **On-Chip Frame Buffer Size**

  Use this item to set the VGA frame buffer size.

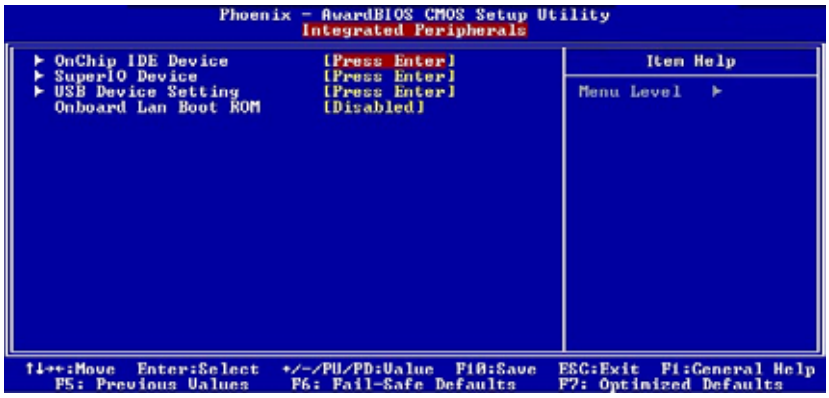
- **DVMT Mode**
  DVMT (Dynamic Video Memory Technology) helps you select the video mode.

- **DVMT/Fixed Memory Size**
  DVMT (Dynamic Video Memory Technology) allows you to select a maximum size of dynamic amount usage of the video memory. The system would configure the video memory dependent on your application.

Press <Esc> to return to the Main Menu page.

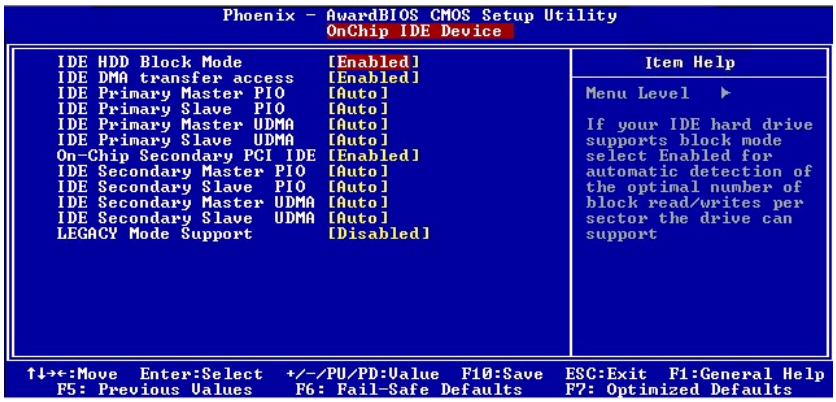
5.8 Integrated Peripherals

This section allows you to configure your SuperIO Device, IDE Function and Onboard Device.


Phoenix - AwardBIOS CMOS Setup Utility
Integrated Peripherals
OnChip IDE Device [Press Enter]
SuperIO Device [Press Enter]
USB Device Setting [Press Enter]
Onboard Lan Boot ROM [Disabled]
Item Help
Menu Level ▶
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

- **OnChip IDE Device**

Scroll to this item and press <Enter> to view the sub menu OnChip IDE Device.


Phoenix - AwardBIOS CMOS Setup Utility
OnChip IDE Device
IDE HDD Block Mode [Enabled]
IDE DMA transfer access [Enabled]
IDE Primary Master PIO [Auto]
IDE Primary Slave PIO [Auto]
IDE Primary Master UDMA [Auto]
IDE Primary Slave UDMA [Auto]
On-Chip Secondary PCI IDE [Enabled]
IDE Secondary Master PIO [Auto]
IDE Secondary Slave PIO [Auto]
IDE Secondary Master UDMA [Auto]
IDE Secondary Slave UDMA [Auto]
LEGACY Mode Support [Disabled]
Item Help
Menu Level ▶
If your IDE hard drive supports block mode select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

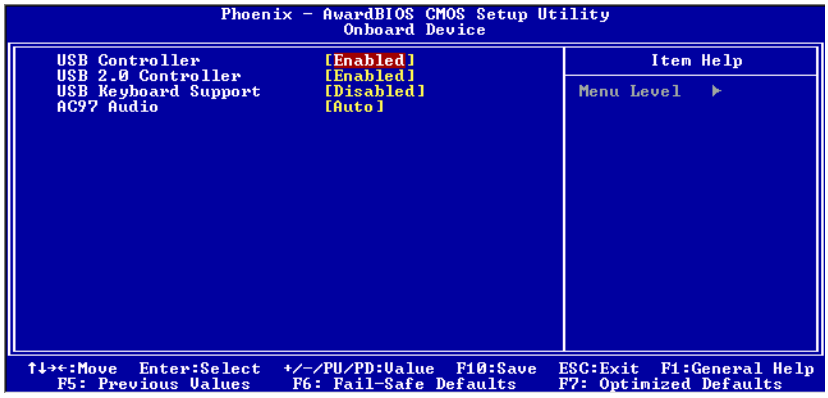
- **IDE HDD Block Mode**
  Block mode is also called block transfer, multiple commands, or multiple sector read/write. If your IDE hard drive supports block mode (most new drives do), select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support.

- **IDE DMA transfer access**
  Automatic data transfer between system memory and IDE device with minimum CPU intervention. This improves data throughput and frees CPU to perform other tasks.
- **IDE Master/Slave PIO**
  The four IDE PIO (Programmed Input/Output) fields let you set a PIO mode (0-4) for each of the four IDE devices that the onboard IDE interface supports. Modes 0 to 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device.
- **IDE Master/Slave UDMA**
  Select the mode of operation for the IDE drive. Ultra DMA-33/66/100/133 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver. If your hard drive and system software both support Ultra DMA-33/66/100/133, select Auto to enable UDMA mode by BIOS.

Press <Esc> to return to the Integrated Peripherals page.

- **Onboard Device**

  Scroll to this item and press <Enter> to view the sub menu Onboard Device.


Phoenix - AwardBIOS CMOS Setup Utility
Onboard Device
USB Controller [Enabled]
USB 2.0 Controller [Enabled]
USB Keyboard Support [Disabled]
AC97 Audio [Auto]
Item Help
Menu Level ▶
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

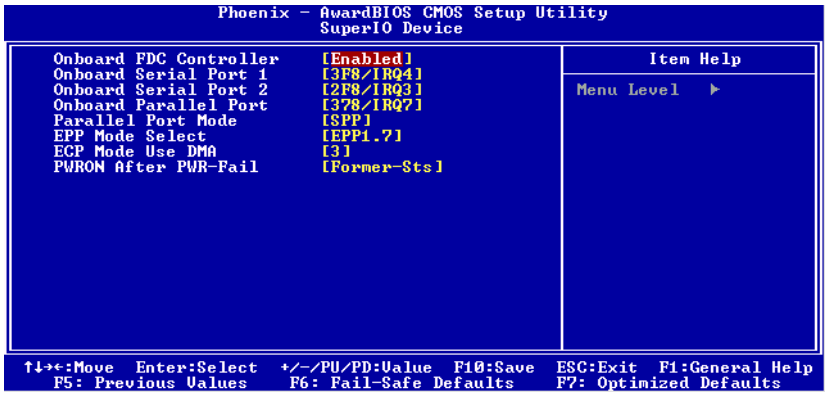
- **USB Controller**
  Enable this item if you are using the USB in the system. You should disable this item if a higher-level controller is added.

- **USB 2.0 Controller**
  Enable this item if you are using the EHCI (USB2.0) controller in the system.
- **USB Keyboard Support**
  Enable this item if the system has a Universal Serial Bus (USB) controller, and you have a USB keyboard.
- **AC'97 Audio**
  Use this item to enable or disable the onboard AC'97 Audio function.

Press <Esc> to return to the Integrated Peripherals page.

- **Super IO Device**

  Scroll to this item and press <Enter> to view the sub menu Super IO Device.


Phoenix - AwardBIOS CMOS Setup Utility
SuperIO Device
Onboard FDC Controller [Enabled]
Onboard Serial Port 1 [3F8/IRQ4]
Onboard Serial Port 2 [2F8/IRQ3]
Onboard Parallel Port [378/IRQ7]
Parallel Port Mode [SPP]
EPP Mode Select [EPP1.7]
ECP Mode Use DMA [3]
PWRON After PWR-Fail [Former-Sts]
Item Help
Menu Level ▶
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

- **Onboard FDC Controller**
  Select Enabled, if your system has a floppy disk controller (FDC) installed on the system board and you want to use it. If you install and-in FDC or the system has no floppy drive, select Disabled in this field. Options: Enabled and Disabled.
- **Onboard Serial Port 1 / 2**
  Select an address and corresponding interrupt for the serial port. Options: 3F8/IRQ4, 2E8/IRQ3, 3E8/IRQ4, 2F8/IRQ3, Disabled, Auto.
- **Onboard Paralellel Port**
  This item allows you to determine the I/O address for

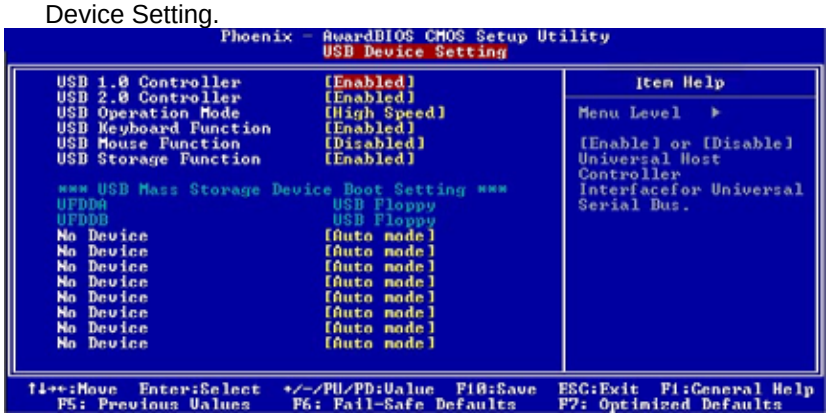
onboard parallel port. Options: 378H/IRQ7, 278H/IRQ5, 3BC/IRQ7 and Disabled.

- **Parallel Port Mode**
  Select an operating mode for the onboard parallel (printer) port. Select Normal unless your hardware and software require another mode in this field. Options: EPP1.9, ECP, SPP, ECPEPP1.7, EPP1.7.
- **EPP Mode Select**
  Select EPP port type 1.7 or 1.9.
- **ECP Mode Use DMA**
  Select a DMA channel for the parallel port while using the ECP mode.
- **PWRON After PWR-Fail**
  This item enables your computer to automatically restart or return to its operating status.

Press <Esc> to return to the Integrated Peripherals page.

- **USB Device Setting**

  Scroll to this item and press <Enter> to view the sub menu USB Device Setting.


Phoenix - AwardBIOS CMOS Setup Utility
USB Device Setting
USB 1.0 Controller [Enabled]
USB 2.0 Controller [Enabled]
USB Operation Mode [High Speed]
USB Keyboard Function [Enabled]
USB Mouse Function [Disabled]
USB Storage Function [Enabled]
*** USB Mass Storage Device Boot Setting ***
UFDDA USB Floppy
UFDDB USB Floppy
No Device [Auto mode]
No Device [Auto mode]
No Device [Auto mode]
No Device [Auto mode]
No Device [Auto mode]
No Device [Auto mode]
No Device [Auto mode]
No Device [Auto mode]
Item Help
Menu Level ▶
[Enable] or [Disable] Universal Host Controller Interfacefor Universal Serial Bus.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

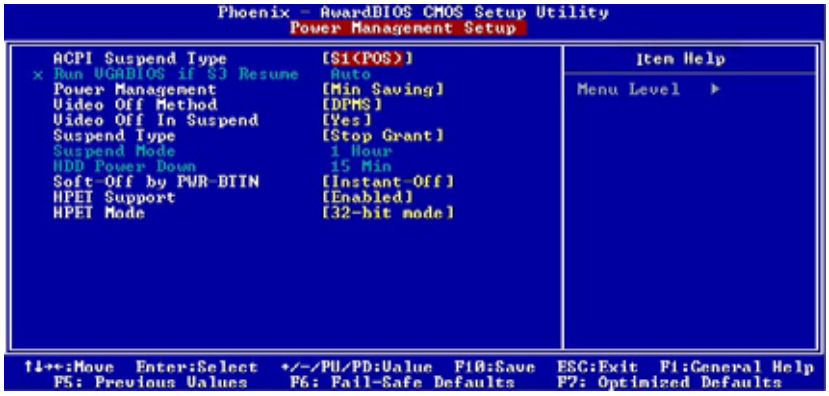
Press <Esc> to return to the Integrated Peripherals page.

- **Onboard Lan Boot ROM**
  Use this item to enable or disable the Boot ROM function of the onboard LAN chip when the system boots up.

Press <Esc> to return to the Main Menu page.

5.9 Power Management Setup

The Power Management Setup allows you to save energy of your system effectively. It will shut down the hard disk and turn OFF video display after a period of inactivity.


Phoenix - AwardBIOS CMOS Setup Utility
Power Management Setup
ACPI Suspend Type [S1(POS)]
× Run VGABIOS if S3 Resume Auto
Power Management [Min Saving]
Video Off Method [DPMS]
Video Off In Suspend [Yes]
Suspend Type [Stop Grant]
Suspend Mode 1 Hour
HDD Power Down 15 Min
Soft-Off by PWR-BTTN [Instant-Off]
HPET Support [Enabled]
HPET Mode [32-bit mode]
Item Help
Menu Level ▶
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

- **ACPI Suspend Type**
  This item specifies the power saving modes for ACPI function. If your operating system supports ACPI, such as Windows 98SE, Windows ME and Windows 2000, you can choose to enter the Standby mode in S1 (POS) or S3 (STR) fashion through the setting of this field. Options are:
  [S1 (POS)] The S1 sleep mode is a low power state. In this state, no system context is lost (CPU or chipset) and hardware maintains all system contexts.
  [S3 (STR)] The S3 sleep mode is a lower power state where the information of system configuration and open applications/files is saved to main memory that remains powered while most other hardware components turn off to save energy. The information stored in memory will be used to restore the system when a "wake up" event occurs.
- **Run VGABIOS if S3 Resume**
  When this item is set Auto, the system will run VGA BIOS if it is reaumed from the S3 state.

- **Power Management**
  This option allows you to select the type (or degree) of power saving for Doze, Standby, and Suspend modes. The table below describes each power management mode:

Max Saving	It is maximum power savings, only available for SL CPUs. The inactivity period is 1 minute in each mode.
User Define	It sets each mode. Select time-out periods in the PM Timers section.
Min Saving	It is minimum power savings. The inactivity period is 1 hour in each mode (except the hard drive).
Disabled	Default value

- **Video Off Method**
  This setting determines the manner in which the monitor is blanked.

V/H SYNC+Blank	It turns OFF vertical and horizontal synchronization ports and writes blanks to the video buffer.
DPMS	Select this option if your monitor supports the Display Power Management Signaling (DPMS) standard of the Video Electronics Standards Association (VESA). Use the supplied software for your video subsystem to select video power management values.
Blank Screen	The System only writes blanks to the video buffer.

- **Video Off In Suspend**

  This item defines if the video is powered down when the system is put into suspend mode.

- **Suspend Type**

  If this item is set to the default Stop Grant, the CPU will go into Idle Mode during power saving mode.

- **Suspend Mode**
  After the selected period of system inactivity (1 minute to 1 hour), all devices except the CPU shut off. The default value is *"Disabled"*.

Disabled	System will never enter SUSPEND mode
1/2/4/6/8/10/20/30/40 Min/1 Hr	Defines the continuous idle time before the system entering SUSPEND mode. If any item defined in (J) is enabled & active, SUSPEND timer will be reloaded

- **HDD Power Down**
  If HDD activity is not detected for the length of time specified in this field, the hard disk drive will be powered down while all other devices remain active.

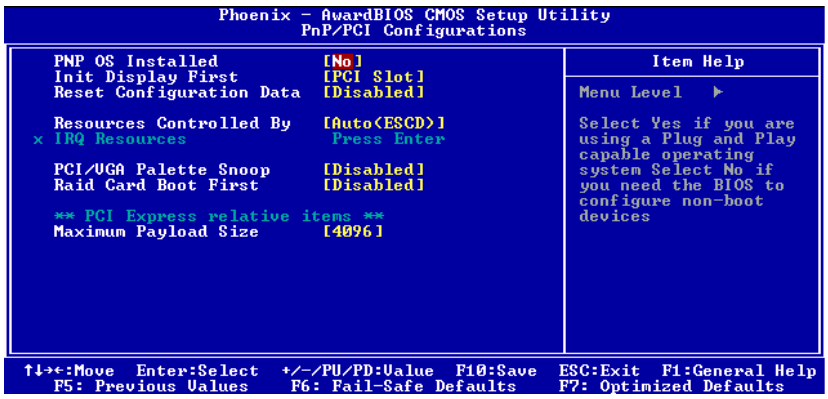
- **Soft-Off by PWR-BTTN**
  This option only works with systems using an ATX power supply. It also allows users to define which type of soft power OFF sequence the system will follow. The default value is *"Instant-Off"*.

Instant-Off	This option follows the conventional manner of system performance when turning the power to OFF. Instant-Off is a software power OFF sequence requiring the power supply button is switched to OFF.
Delay 4 Sec.	Upon the system's turning OFF through the power switch, this option will delay the complete system power OFF sequence approximately 4 seconds. Within this delay period, the system will temporarily enter into the Suspend Mode enabling you to restart the system at once.

Press <Esc> to return to the Main Menu page.

5.10 PnP/PCI Configuration Setup

This section describes the configuration of PCI (Personal Computer Interconnect) bus system, which allows I/O devices to operate at speeds close to the CPU speed while communicating with other important components. This section covers very technical items that only experienced users could change default settings.


Phoenix - AwardBIOS CMOS Setup Utility
PnP/PCI Configurations
PNP OS Installed [No]
Init Display First [PCI Slot]
Reset Configuration Data [Disabled]
Resources Controlled By [Auto(ESCD)]
x IRQ Resources Press Enter
PCI/VGA Palette Snoop [Disabled]
Raid Card Boot First [Disabled]
** PCI Express relative items **
Maximum Payload Size [4096]
Item Help
Menu Level ▶
Select Yes if you are using a Plug and Play capable operating system Select No if you need the BIOS to configure non-boot devices
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

- **PNP OS Installed**
  Select Yes if the system operating environment is Plug-and-Play aware (e.g., Windows 95). The default value is *"No"*.

- **Init Display First**
  This item allows you to decide whether PCI Slot or AGP to be the first primary display card.

- **Reset Configuration Data**
  Normally, you leave this item Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup or if installing a new add-on cause the system reconfiguration a serious conflict that the operating system can not boot. Options: Enabled, Disabled.

- **Resources Controlled By**
  The Award Plug and Play BIOS can automatically configure all boot and Plug and Play-compatible devices. If you select Auto, all interrupt request (IRQ), DMA assignment, and Used DMA fields disappear, as the BIOS automatically assigns them. The default value is *"Manual"*.

- **IRQ Resources**
  When resources are controlled manually, assign each system interrupt to one of the following types in accordance with the type of devices using the interrupt:
  1. Legacy ISA Devices compliant with the original PC AT bus specification, requiring a specific interrupt (such as IRQ4 for serial port 1).
  2. PCI/ISA PnP Devices compliant with the Plug and Play standard, whether designed for PCI or ISA bus architecture.

  The default value is *"PCI/ISA PnP"*.

- **PCI/VGA Palette Snoop**
  Some non-standard VGA display cards may not show colors properly. This item allows you to set whether MPEG ISA/VESA VGA Cards can work with PCI/VGA or not. When enabled, a PCI/VGA can work with a MPEG ISA/VESA VGA card; when disabled, a PCI/VGA cannot work with a MPEG ISA/VESA Card.

- **Rapid Card Boot First**

  This item helps you use additional PCI RAID card boot.

**** PCI Express relative items ****

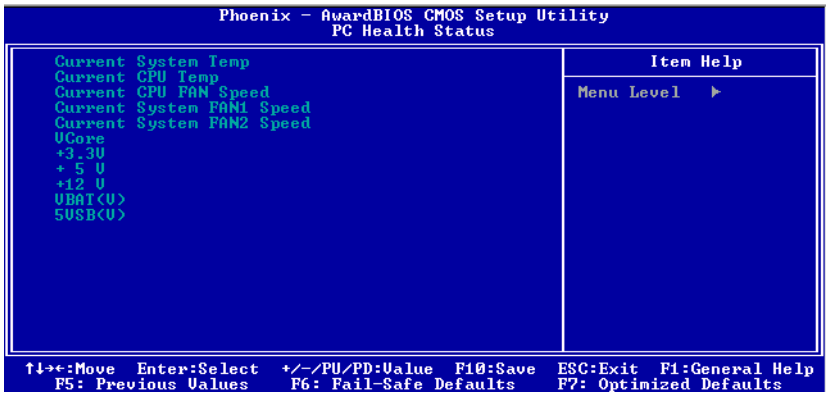
- **Maximum Payload Size**

  When using DDR SDRAM and Buffer size selection, another consideration in designing a payload memory is the size of the buffer for data storage. Maximum Payload Size defines the maximum TLP (Transaction Layer Packet) data payload size for the device.

Press <Esc> to return to the Main Menu page.

5.11 PC Health Status

This section supports hardware monitering that lets you monitor those parameters for critical voltages, temperatures and fan speed of the board.

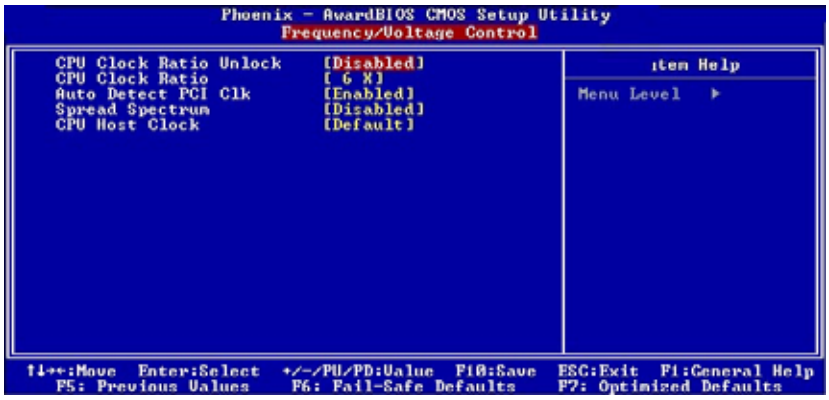


- **Current SYSTEM Temperature**
  Show you the current system1 temperature.
- **Current CPU Temperature**
  The current system CPU temperature will be automatically detected by the system.
- **Current CPU FAN Speed**
  These optional and read-only items show current speeds in RPM (Revolution Per Minute) for the CPU fan and chassis fan as monitored by the hardware monitoring IC.
- **Current SYSTEM FAN1 Speed**
  Show you the current system fan1 temperature.
- **Current SYSTEM FAN2 Speed**
  Show you the current system fan1 temperature.
- **Vcore +3.3V/+5V/+12V/VBAT(V)/5VSB**
  Show you the voltage of +3.3V/+5V/+12V.

Press <Esc> to return to the Main Menu page.

5.12 Frequency/Voltage Control

This section is to control the CPU frequency and Supply Voltage, DIMM OverVoltage and PCI EXPRESS X16 voltage.

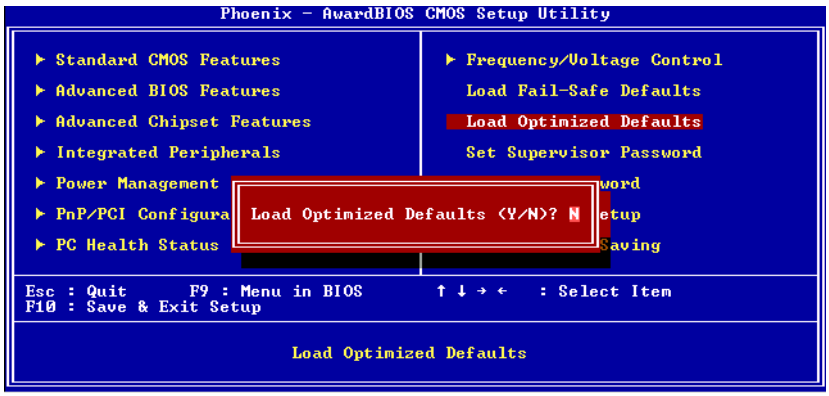

Phoenix - AwardBIOS CMOS Setup Utility
Frequency/Voltage Control
CPU Clock Ratio Unlock [Disabled]
CPU Clock Ratio [6 X]
Auto Detect PCI Clk [Enabled]
Spread Spectrum [Disabled]
CPU Host Clock [Default]
Item Help
Menu Level ▶
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

- **CPU Clock Ratio Unlock**
  Use this item to unlock CPU multiplier.
- **CPU Clock Ratio**
  Use this item to select the CPU's frequency.
- **Auto Detect PCI Clk**
  The enabled item can automatically disable the clock source for a PCI slot without a module, to reduce EMI (ElectroMagnetic Interference).
- **Spread Spectrum**
  If spread spectrum is enabled, EMI (ElectroMagnetic Interference) generated by the system can be significantly reduced.
- **CPU Host Clock**
  Select Default or select a timing combination for the CPU bus. When set to Default, the BIOS uses the actual CPU bus clock values.

Press <Esc> to return to the Main Menu page.

5.13 Load Optimized Defaults

This option allows you to load your system configuration with default values. These default settings are optimized to enable high performance features.



To load CMOS SRAM with SETUP default values, please enter "Y". If not, please enter "N".

5.14 Set Supervisor/User Password

You can set a supervisor or user password, or both of them. The differences between them are:

1. **Supervisor password:** You can enter and change the options on the setup menu.
2. **User password:** You can just enter, but have no right to change the options on the setup menu.

When you select this function, the following message will appear at the center of the screen to assist you in creating a password.

ENTER PASSWORD

Type a maximum eight-character password, and press <Enter>. This typed password will clear previously entered password from the CMOS memory. You will be asked to confirm this password. Type this password again and press <Enter>. You may also press <Esc> to abort this selection and not enter a password.

To disable the password, just press <Enter> when you are prompted to enter a password. A message will confirm the password is getting disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

PASSWORD DISABLED

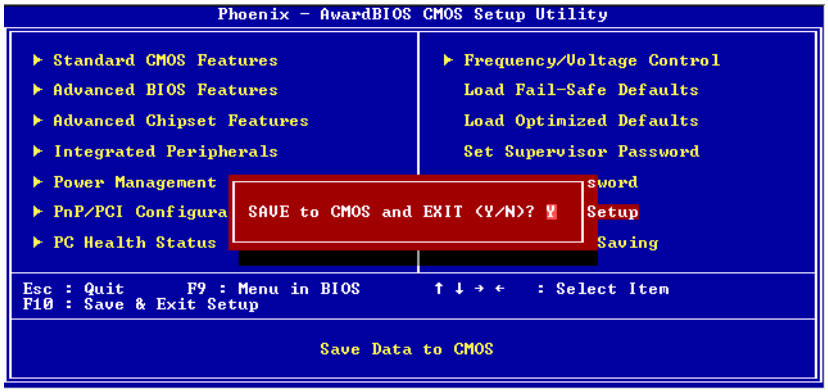
When a password is enabled, you have to type it every time you enter the Setup. It prevents any unauthorized persons from changing your system configuration.

Additionally, when a password is enabled, you can also require the BIOS to request a password every time the system reboots. This would prevent unauthorized use of your computer.

You decide when the password is required for the BIOS Features Setup Menu and its Security option. If the Security option is set to "System", the password is required during booting up and entry into the Setup; if it is set as "Setup", a prompt will only appear before entering the Setup.

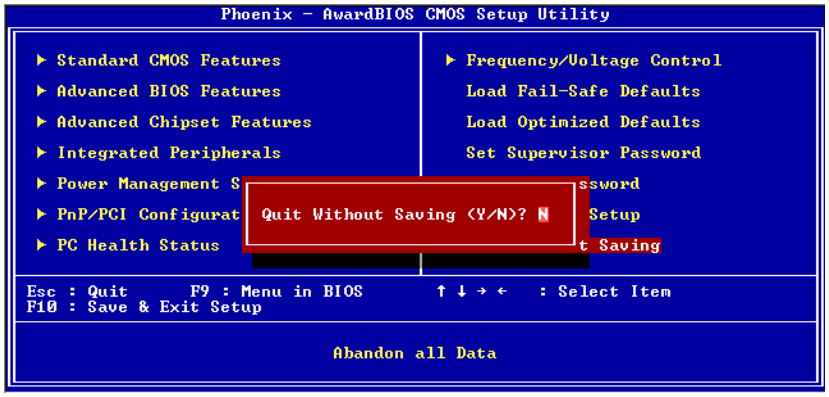
5.15 Save & Exit Setup

This section allows you to determine whether or not to accept your modifications. Type "Y" to quit the setup utility and save all changes into the CMOS memory. Type "N" to bring you back to the Setup utility.



5.16 Exit Without Saving

Select this option to exit the Setup utility without saving changes you have made in this session. Type "Y", and it will quit the Setup utility without saving your modifications. Type "N" to return to the Setup utility.



Chapter 6
Installation of Drivers

The device drivers are located on the Product Information CD-ROM that comes with the SBC81205 Series package. The auto-run function of drivers will guide you to install the utilities and device drivers under a Windows system. You can follow the onscreen instructions to install these devices:

- Chipset
- VGA
- LAN
- Audio

6.1 Installing Chipset Driver

1. Run the SETUP.EXE program from the driver directory in your driver CD. Click "Next" to next step.

Intel® Chipset Device Software
Intel® Chipset Device Software
intel
Welcome to the Setup Program
This setup program will install the Intel® Chipset Device Software onto this computer. It is strongly recommended that you exit all Windows* programs before continuing.
< Back
Next >
Cancel
Intel® InstallShield Framework

2. An Intel® License Agreement appears to show you the important information. Click "Yes" to next step.

Intel® Chipset Device Software
Intel® Chipset Device Software
License Agreement
intel
You must accept all of the terms of the license agreement in order to continue the setup program. Do you accept the terms?
INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
Please Also Note:
* If you are an Original Equipment Manufacturer (OEM), Independent Hardware Vendor (IHV), or Independent Software Vendor (ISV), this complete LICENSE AGREEMENT applies;
< Back
Yes
No
Intel® Installation Framework

3. Please wait while running the following setup operations.

Intel® Chipset Device Software
Intel® Chipset Device Software
Setup Progress
intel
Please wait while the following setup operations are performed:
Installing Driver: Intel(R) Q963/Q965 PCI Express Root Port - 2991
Version: 8.3.0.1011
Installing Driver: Intel(R) ICH8DO LPC Interface Controller - 2814
Version: 8.3.0.1013
Installing Driver: Intel(R) ICH8 Family PCI Express Root Port 1 - 283F
Version: 8.3.0.1013
Installing Driver: Intel(R) ICH8 Family PCI Express Root Port 4 - 2845
Version: 8.3.0.1013
Installing Driver: Intel(R) ICH8 Family PCI Express Root Port 5 - 2847
Version: 8.3.0.1013
Intel® Installation Framework

Intel® Chipset Device Software
Intel® Chipset Device Software
Setup Progress
intel
Please wait while the following setup operations are performed:
Installing Driver: Intel(R) ICH8 Family USB Universal Host Controller - 2834
Version: 8.0.0.1008
Installing Driver: Intel(R) ICH8 Family USB Universal Host Controller - 2835
Version: 8.0.0.1008
Installing Driver: Intel(R) ICH8 Family USB2 Enhanced Host Controller - 2836
Version: 8.0.0.1008
Installing Driver: Intel(R) ICH8 Family USB2 Enhanced Host Controller - 283A
Version: 8.0.0.1008
Click Next to continue.
Next
Intel® InstallShield Framework

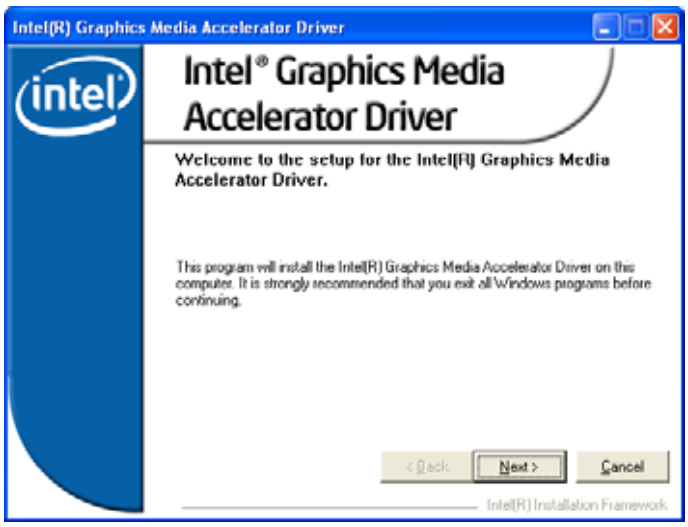
4. Click "Finish" to complete the setup process.

Intel® Chipset Device Software
Intel® Chipset Device Software
Setup Is Complete
intel
The setup program successfully installed the Intel® Chipset Device Software onto this computer.
Click Finish to complete the setup process.
Finish
Intel® InstallShield Framework

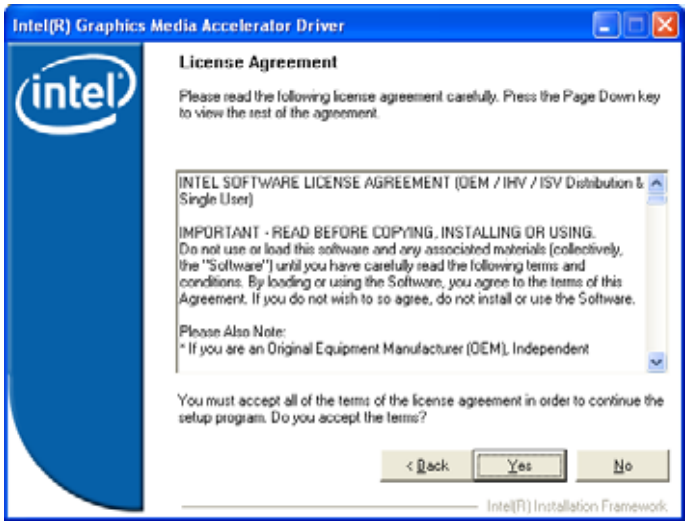
5. You will be asked to reboot your computer when the installation is completed. Please click "Yes, I want to restart my computer now" if you don't need to install any other drivers. Otherwise, please click "No, I will restart my computer later", and go on next step.

6.2 Installing VGA Driver

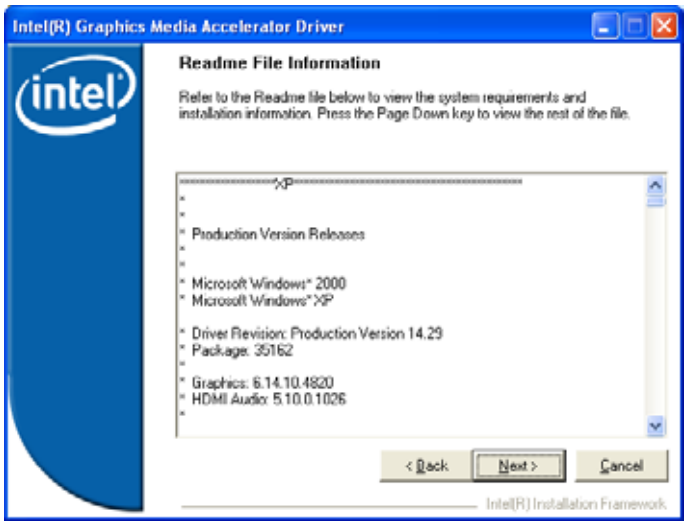
1. Run the SETUP.EXE program from the driver directory in your driver CD. Click "Next" to next step.


Intel(R) Graphics Media Accelerator Driver
intel
Intel® Graphics Media Accelerator Driver
Welcome to the setup for the Intel(R) Graphics Media Accelerator Driver.
This program will install the Intel(R) Graphics Media Accelerator Driver on the computer. It is strongly recommended that you exit all Windows programs before continuing.
< Back
Next >
Cancel
Intel(R) Installation Framework

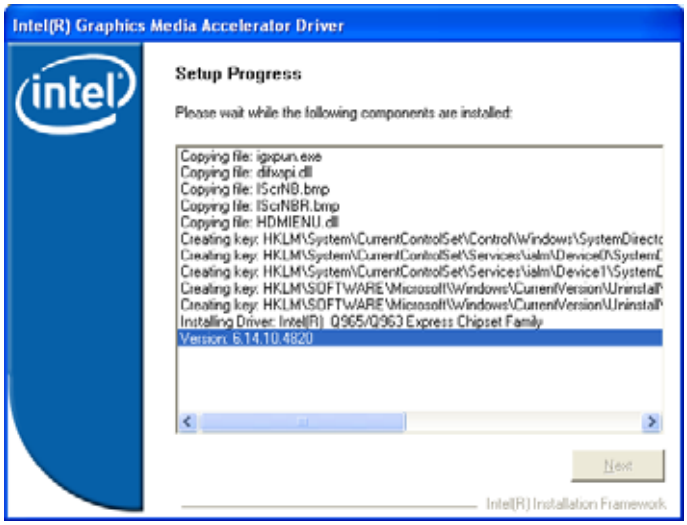
2. An Intel® License Agreement appears to show you the important information. Click "Yes" to next step.


Intel(R) Graphics Media Accelerator Driver
License Agreement
Please read the following license agreement carefully. Press the Page Down key to view the rest of the agreement.
INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
Please Also Note:
* If you are an Original Equipment Manufacturer (OEM), Independent
You must accept all of the terms of the license agreement in order to continue the setup program. Do you accept the terms?
< Back
Yes
No
Intel(R) Installation Framework

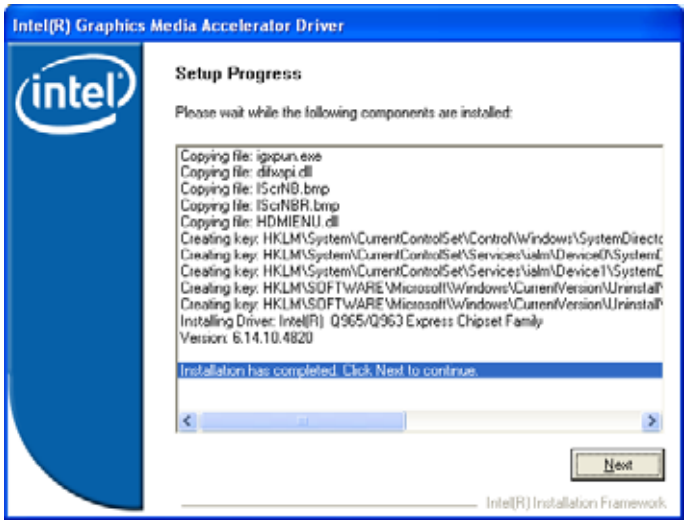
3. The message of Readme File Information appears to show you the system requirements and installation information. Please click "Next".


Intel(R) Graphics Media Accelerator Driver
Readme File Information
Refer to the Readme file below to view the system requirements and installation information. Press the Page Down key to view the rest of the file.
Production Version Releases
Microsoft Windows* 2000
Microsoft Windows* XP
Driver Revision: Production Version 14.29
Package: 35162
Graphics: 6.14.10.4820
HDMI Audio: 5.10.0.1026
< Back
Next >
Cancel
Intel(R) Installation Framework

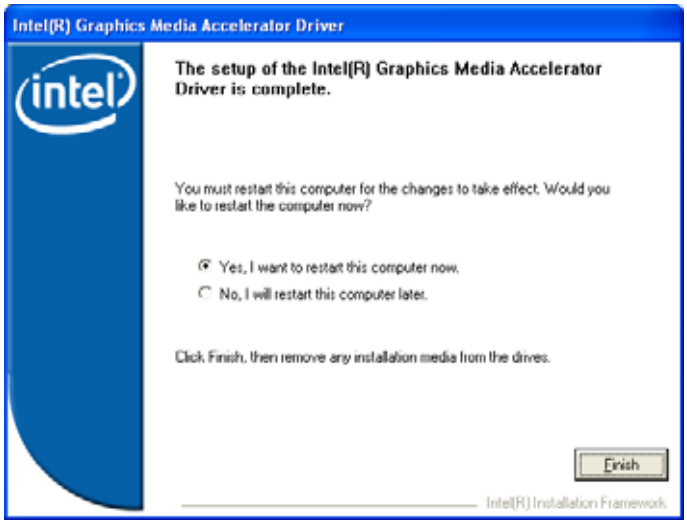
4. Please wait while running the following setup operations.



5. When this message appears, please click "Next".

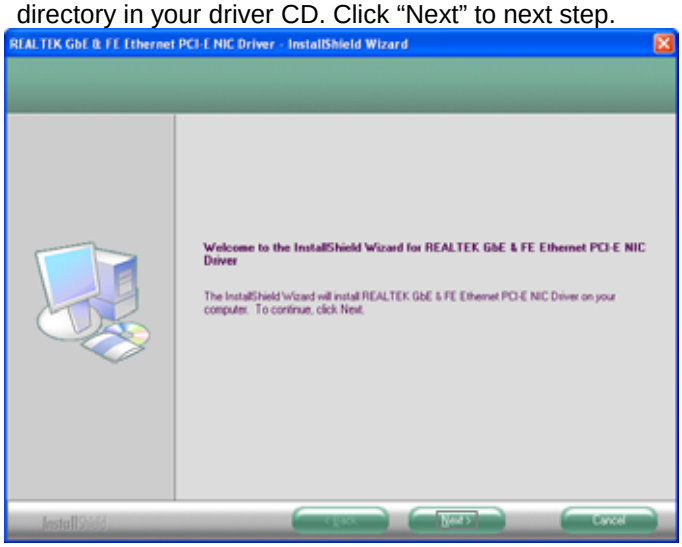


6. You will be asked to reboot your computer when the installation is completed. Please click "Yes, I want to restart my computer now" if you don't need to install any other drivers. Otherwise, please click "No, I will restart my computer later", and click "Finish" to complete the installation.

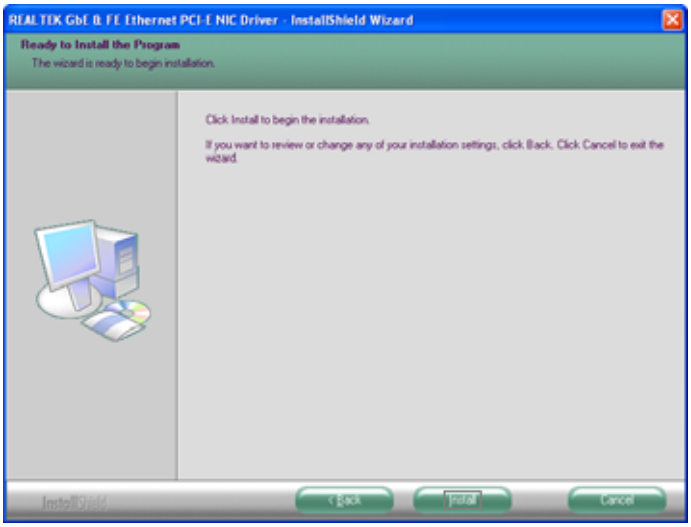

Intel(R) Graphics Media Accelerator Driver
intel
The setup of the Intel(R) Graphics Media Accelerator Driver is complete.
You must restart this computer for the changes to take effect. Would you like to restart the computer now?
Yes, I want to restart this computer now.
No, I will restart this computer later.
Click Finish, then remove any installation media from the drives.
Finish
Intel(R) Installation Framework

6.3 Installing LAN Driver

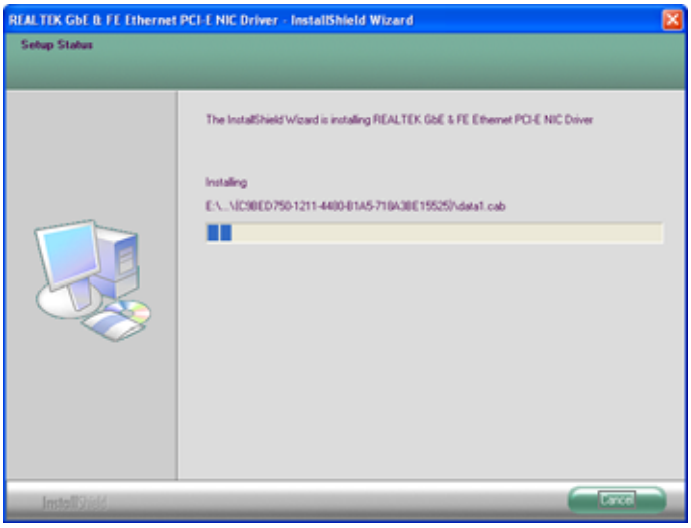
1. Run the InstallShield Wizard for Ethernet from the driver directory in your driver CD. Click "Next" to next step.


REALTEK GbE & FE Ethernet PCI-E NIC Driver - InstallShield Wizard
Welcome to the InstallShield Wizard for REALTEK GbE & FE Ethernet PCI-E NIC Driver
The InstallShield Wizard will install REALTEK GbE & FE Ethernet PCI-E NIC Driver on your computer. To continue, click Next.
InstallShield
< Back
Next >
Cancel

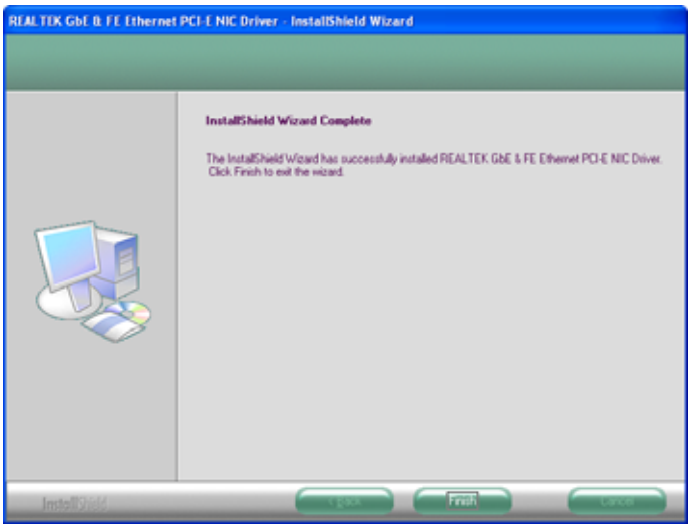
2. Click "Install" to start the installation.


REALTEK GbE & FE Ethernet PCI-E NIC Driver - InstallShield Wizard
Ready to Install the Program
The wizard is ready to begin installation.
Click Install to begin the installation.
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
InstallShield
< Back
Install
Cancel

3. Please wait while running the following installation operation.


REALTEK GbE & FE Ethernet PCI-E NIC Driver - InstallShield Wizard
Setup Status
The InstallShield Wizard is installing REALTEK GbE & FE Ethernet PCI-E NIC Driver
Installing
Cancel

4. Click "Finish" to complete the installation.


REALTEK GbE & FE Ethernet PCI-E NIC Driver - InstallShield Wizard
InstallShield Wizard Complete
The InstallShield Wizard has successfully installed REALTEK GbE & FE Ethernet PCI-E NIC Driver. Click Finish to exit the wizard.
Finish

MEMO

Appendix A
Watchdog Timer

Watchdog Timer Setting

After the system stops working for a while, it can be auto-reset by the Watchdog Timer. The integrated Watchdog Timer can be set up in the system reset mode by program.

Using the Watchdog Function

Start
↓
Un-Lock WDT **:O 2E 87 ; Un-lock super I/O**
O 2E 87 ; Un-lock super I/O
↓
Set WDT Funtion
O 2E 2D
O 2F 20
Select Logic device
O 2E 07
O 2F 08
↓
Activate WDT **:O 2E 30**
O 2F 01

Set Second or Minute
O 2E F5
O 2F N **N=00 or 08(See below table)**
↓
Set base timer **:O 2E F6**
O 2F M=00,01,02,…FF(Hex) ,Value=0 to 255
↓
WDT counting

re-set timer **:O 2E F6**
O 2F M ; M=00,01,02,…FF(See below table)
↓
IF No re-set timer **:WDT time-out, generate RESET**

IF to disable WDT **:O 2E 30**
O 2F 00 ; Can be disable at any time

N=00

M= 00h: Time-out Disable
01h: Time-out occurs after 1 second
02h: Time-out occurs after 2 second
03h: Time-out occurs after 3 second
……
FFh: Time-out occurs after 255 second

N=08

M= 00h: Time-out Disable
01h: Time-out occurs after 1 minute
02h: Time-out occurs after 2 minutes
03h: Time-out occurs after 3 minutes
……
FFh: Time-out occurs after 255 minutes

A p p e n d i x B
PCI IRQ Routing

PICMG PCI IRQ Routing

Device	ID	Slot	Int
PCI Slot 0	31	0	BCDA
PCI Slot 1	30	1	CDAB
PCI Slot 2	29	2	DABC
PCI Slot 3	28	3	ABCD

On Board Device IRQ Routing

Device	ID	Slot	Int
PCI-ISA Bridge	22	4	

MEMO

A p p e n d i x C
Configuring SATA for RAID Function

Configuring SATA Hard Drive(s) for RAID Function (Controller: Intel® ICH9R/DO only)

Please follow up the steps below to configure SATA hard drive(s):
(1) Install SATA hard drive(s) in your system.
(2) Enter the BIOS Setup to configure SATA controller mode and boot sequence.
(3) Configure RAID by the RAID BIOS.
(4) Create a floppy disk for the SATA controller driver.
(5) Install the SATA controller driver during the OS installation.

Before you begin the SATA configuration, please prepare:
(a) Two SATA hard drives (to ensure optimal performance, it is recommended that you use two hard drives with identical model and capacity). If you do not want to create RAID with the SATA controller, you may prepare only one hard drive.
(b) An empty formatted floppy disk
(c) Windows XP setup disk

(1) Installing SATA hard drive(s) in your system
Connect one end of the SATA signal cable to the rear of the SATA hard drive, and the other end to available SATA port(s) on the board. Then, connect the power connector of power supply to the hard drive.

(2) Configuring SATA controller mode and boot sequence by the BIOS Setup
You have to make sure whether the SATA controller is configured correctly by system BIOS Setup and set up BIOS boot sequence for the SATA hard drive(s).

(2)-1 Turn on your system and press the Del button to enter BIOS Setup during running POST (Power-On Self Test).

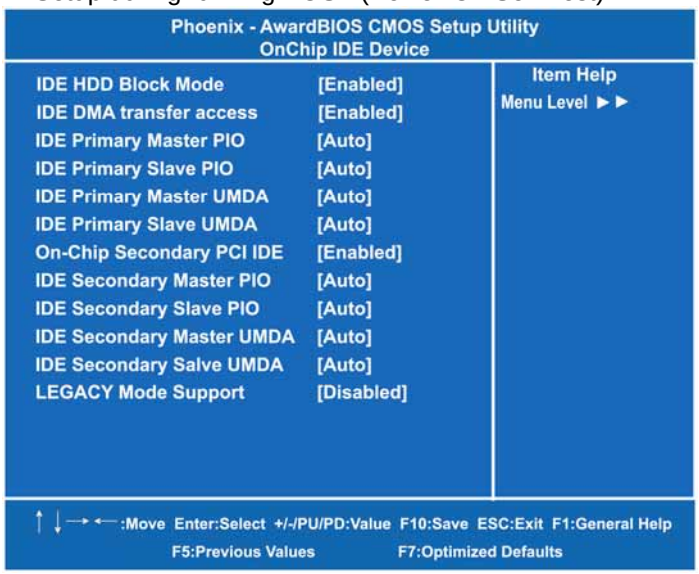

Phoenix - AwardBIOS CMOS Setup Utility
OnChip IDE Device
IDE HDD Block Mode [Enabled]
IDE DMA transfer access [Enabled]
IDE Primary Master PIO [Auto]
IDE Primary Slave PIO [Auto]
IDE Primary Master UMDA [Auto]
IDE Primary Slave UMDA [Auto]
On-Chip Secondary PCI IDE [Enabled]
IDE Secondary Master PIO [Auto]
IDE Secondary Slave PIO [Auto]
IDE Secondary Master UMDA [Auto]
IDE Secondary Salve UMDA [Auto]
LEGACY Mode Support [Disabled]
Item Help
Menu Level ►►
:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F7:Optimized Defaults

Figure 1

(2)-2 Set **CDROM** for **First Boot Device** under the **Advanced BIOS Features** menu to boot CD-ROM after system restarts (Figure 2).

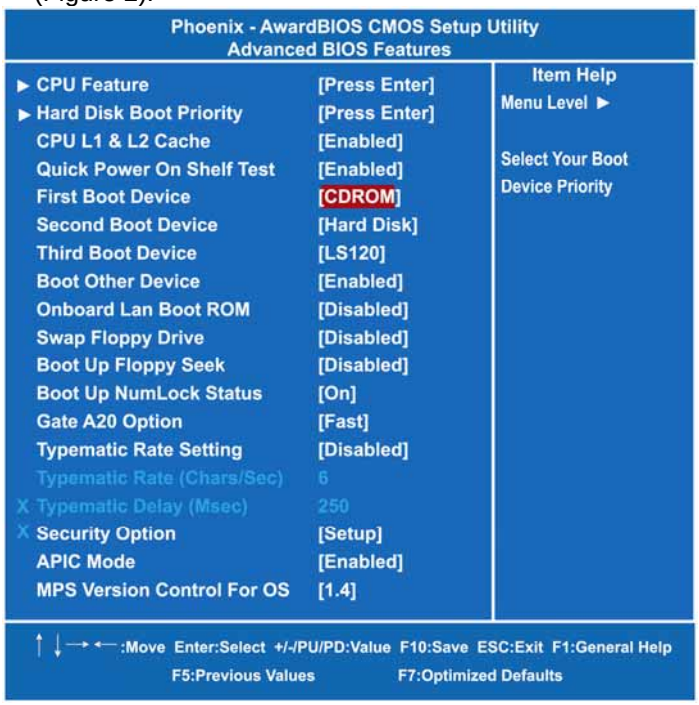

Phoenix - AwardBIOS CMOS Setup Utility
Advanced BIOS Features
▶ CPU Feature [Press Enter]
▶ Hard Disk Boot Priority [Press Enter]
CPU L1 & L2 Cache [Enabled]
Quick Power On Shelf Test [Enabled]
First Boot Device [CDROM]
Second Boot Device [Hard Disk]
Third Boot Device [LS120]
Boot Other Device [Enabled]
Onboard Lan Boot ROM [Disabled]
Swap Floppy Drive [Disabled]
Boot Up Floppy Seek [Disabled]
Boot Up NumLock Status [On]
Gate A20 Option [Fast]
Typematic Rate Setting [Disabled]
Typematic Rate (Chars/Sec) 6
X Typematic Delay (Msec) 250
X Security Option [Setup]
APIC Mode [Enabled]
MPS Version Control For OS [1.4]
Item Help
Menu Level ▶
Select Your Boot Device Priority
:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F7:Optimized Defaults

Figure 2

(2)-3 Save and exit the BIOS Setup.

(3) Configuring RAID by the RAID BIOS

Enter the RAID BIOS setup utility to configure a RAID array. Skip this step and proceed to Section 4 if you do not want to create a RAID.

(3)-1 After the POST memory testing and before the operating system booting, a message "*Press <Ctrl-I> to enter Configuration Utility*" (as Figure 3) shows up, accordingly, press <CTRL+ I> to enter the RAID BIOS setup utility.

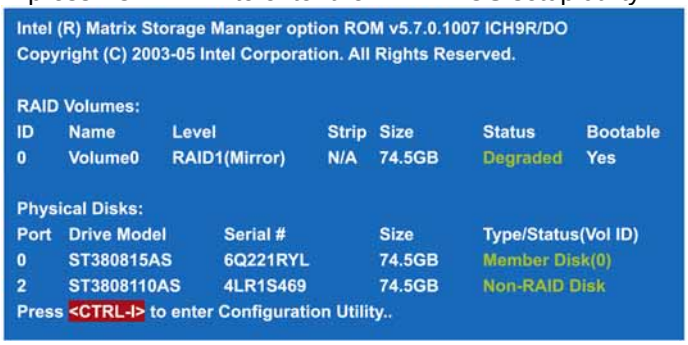

Intel (R) Matrix Storage Manager option ROM v5.7.0.1007 ICH9R/DO
Copyright (C) 2003-05 Intel Corporation. All Rights Reserved.
RAID Volumes:
ID Name Level Strip Size Status Bootable
0 Volume0 RAID1(Mirror) N/A 74.5GB Degraded Yes
Physical Disks:
Port Drive Model Serial # Size Type/Status(Vol ID)
0 ST380815AS 6Q221RYL 74.5GB Member Disk(0)
2 ST3808110AS 4LR1S469 74.5GB Non-RAID Disk
Press <CTRL-I> to enter Configuration Utility..

Figure 3

(3)-2 After you press <CTRL+ I>, the **Create RAID Volume** screen will appear (as Figure 4). If you want to create a RAID array, select the **Create RAID Volume** option in the Main Menu and press ENTER.

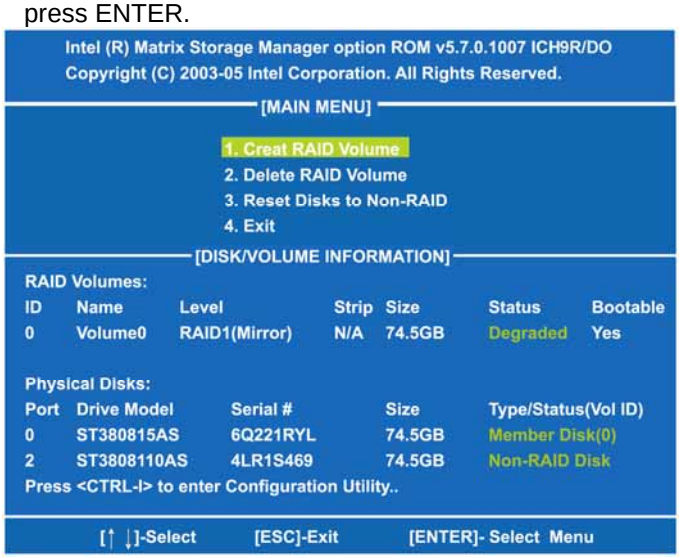

Intel (R) Matrix Storage Manager option ROM v5.7.0.1007 ICH9R/DO
Copyright (C) 2003-05 Intel Corporation. All Rights Reserved.
[MAIN MENU]
1. Creat RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Exit
[DISK/VOLUME INFORMATION]
RAID Volumes:
ID Name Level Strip Size Status Bootable
0 Volume0 RAID1(Mirror) N/A 74.5GB Degraded Yes
Physical Disks:
Port Drive Model Serial # Size Type/Status(Vol ID)
0 ST380815AS 6Q221RYL 74.5GB Member Disk(0)
2 ST3808110AS 4LR1S469 74.5GB Non-RAID Disk
Press <CTRL-I> to enter Configuration Utility..
[↑ ↓]-Select [ESC]-Exit [ENTER]- Select Menu

Figure 4

(3)-3 After entering the **CREAT VOLUME MENU** screen, you can type the disk array name with 1~16 letters (letters cannot be special characters) in the item "Name". When finished, press ENTER to select a RAID level (as Figure 5). There are three RAID levels, RAID0, RAID1 and RAID5&RAID10. Select a RAID level and press ENTER.

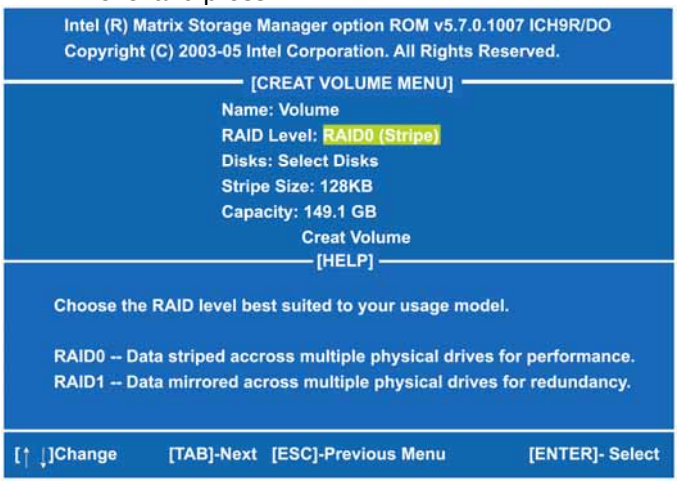

Intel (R) Matrix Storage Manager option ROM v5.7.0.1007 ICH9R/DO
Copyright (C) 2003-05 Intel Corporation. All Rights Reserved.
[CREAT VOLUME MENU]
Name: Volume
RAID Level: RAID0 (Stripe)
Disks: Select Disks
Stripe Size: 128KB
Capacity: 149.1 GB
Creat Volume
[HELP]
Choose the RAID level best suited to your usage model.
RAID0 -- Data striped accross multiple physical drives for performance.
RAID1 -- Data mirrored across multiple physical drives for redundancy.
[↑ ↓]Change [TAB]-Next [ESC]-Previous Menu [ENTER]- Select

Figure 5

(3)-4 Set the stripe block size (as Figure 6). The *KB* is the standard unit of stripe block size. The stripe block size can be 4KB to 128KB. After the setting, press ENTER for the array capacity.

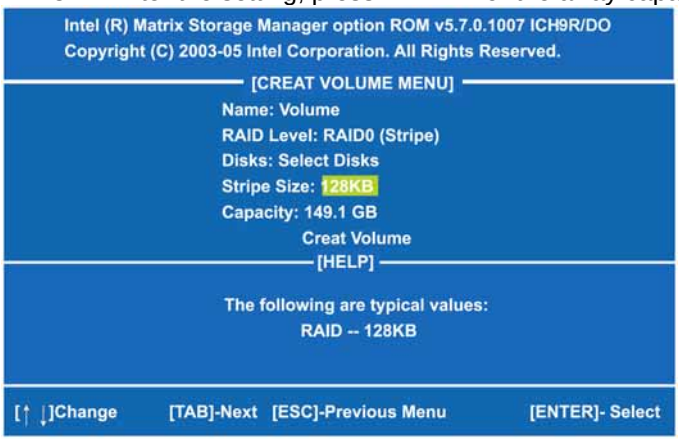

Intel (R) Matrix Storage Manager option ROM v5.7.0.1007 ICH9R/DO
Copyright (C) 2003-05 Intel Corporation. All Rights Reserved.
[CREAT VOLUME MENU]
Name: Volume
RAID Level: RAID0 (Stripe)
Disks: Select Disks
Stripe Size: 128KB
Capacity: 149.1 GB
Creat Volume
[HELP]
The following are typical values:
RAID -- 128KB
[↑ ↓]Change [TAB]-Next [ESC]-Previous Menu [ENTER]- Select

Figure 6

(3)-5 After setting all the items on the menu, select **Create Volume** and press ENTER (as Figure 7) to start creating the RAID array.

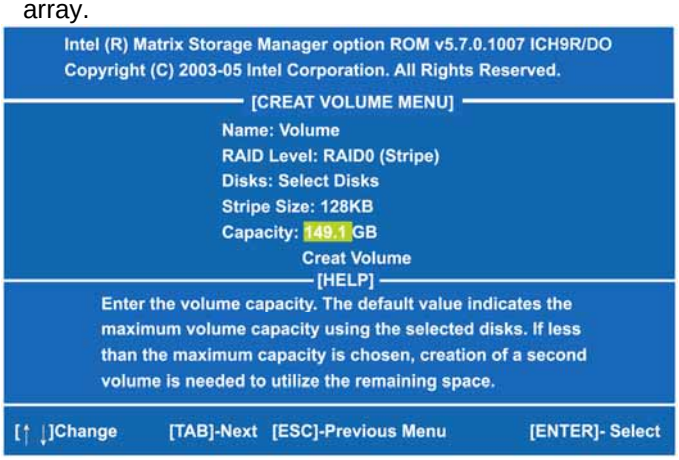

Intel (R) Matrix Storage Manager option ROM v5.7.0.1007 ICH9R/DO
Copyright (C) 2003-05 Intel Corporation. All Rights Reserved.
[CREAT VOLUME MENU]
Name: Volume
RAID Level: RAID0 (Stripe)
Disks: Select Disks
Stripe Size: 128KB
Capacity: 149.1 GB
Creat Volume
[HELP]
Enter the volume capacity. The default value indicates the maximum volume capacity using the selected disks. If less than the maximum capacity is chosen, creation of a second volume is needed to utilize the remaining space.
[↑ ↓]Change
[TAB]-Next
[ESC]-Previous Menu
[ENTER]- Select

Figure 7

(3)-6 When prompting the confirmation, press "*Y*" to create this volume, or "*N*" to cancel the creation.

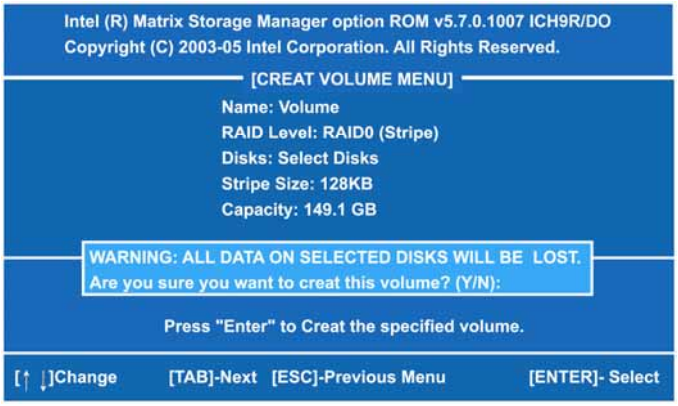

Intel (R) Matrix Storage Manager option ROM v5.7.0.1007 ICH9R/DO
Copyright (C) 2003-05 Intel Corporation. All Rights Reserved.
[CREAT VOLUME MENU]
Name: Volume
RAID Level: RAID0 (Stripe)
Disks: Select Disks
Stripe Size: 128KB
Capacity: 149.1 GB
WARNING: ALL DATA ON SELECTED DISKS WILL BE LOST.
Are you sure you want to creat this volume? (Y/N):
Press "Enter" to Creat the specified volume.
[↑ ↓]Change
[TAB]-Next
[ESC]-Previous Menu
[ENTER]- Select

Figure 8

After the creation is completed, you can see detailed information about the RAID Array in the DISK/VOLUME INFORMATION section, including RAID mode, disk block size, disk name, and disk capacity, etc.

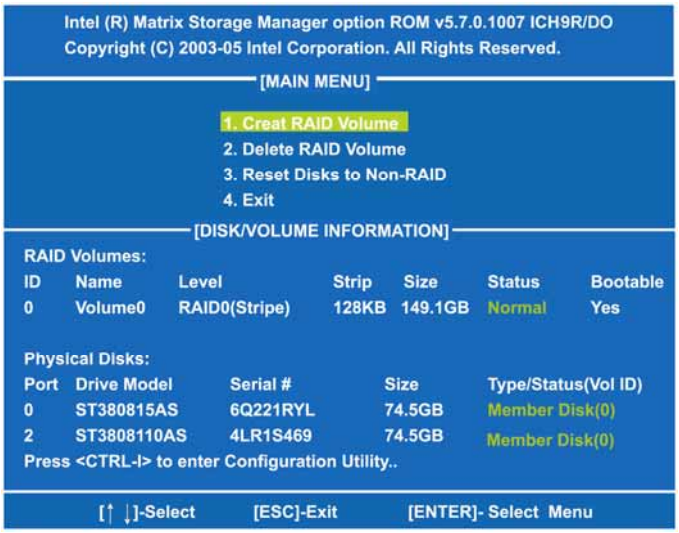

Intel (R) Matrix Storage Manager option ROM v5.7.0.1007 ICH9R/DO
Copyright (C) 2003-05 Intel Corporation. All Rights Reserved.
[MAIN MENU]
1. Creat RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Exit
[DISK/VOLUME INFORMATION]
RAID Volumes:
ID Name Level Strip Size Status Bootable
0 Volume0 RAID0(Stripe) 128KB 149.1GB Normal Yes
Physical Disks:
Port Drive Model Serial # Size Type/Status(Vol ID)
0 ST380815AS 6Q221RYL 74.5GB Member Disk(0)
2 ST3808110AS 4LR1S469 74.5GB Member Disk(0)
Press <CTRL-I> to enter Configuration Utility..
[↑ ↓]-Select [ESC]-Exit [ENTER]- Select Menu

Figure 9

Delete RAID Volume

If you want to delete a RAID volume, select the **Delete RAID Volume** option in Main Menu. Press ENTER and follow on-screen instructions.

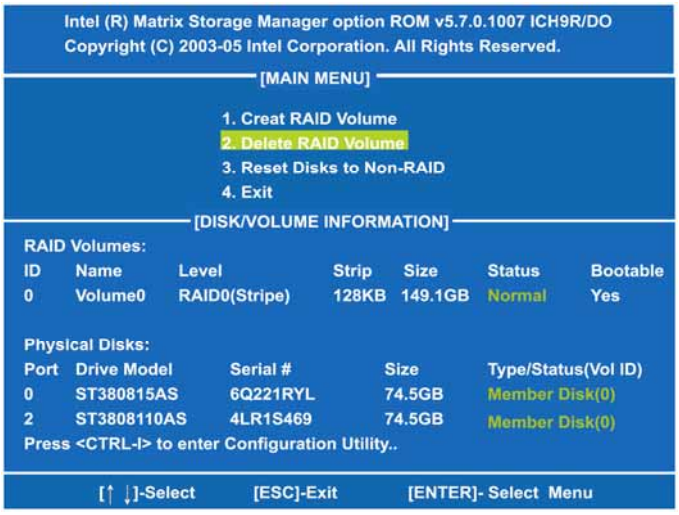

Intel (R) Matrix Storage Manager option ROM v5.7.0.1007 ICH9R/DO
Copyright (C) 2003-05 Intel Corporation. All Rights Reserved.
[MAIN MENU]
1. Creat RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Exit
[DISK/VOLUME INFORMATION]
RAID Volumes:
ID Name Level Strip Size Status Bootable
0 Volume0 RAID0(Stripe) 128KB 149.1GB Normal Yes
Physical Disks:
Port Drive Model Serial # Size Type/Status(Vol ID)
0 ST380815AS 6Q221RYL 74.5GB Member Disk(0)
2 ST3808110AS 4LR1S469 74.5GB Member Disk(0)
Press <CTRL-I> to enter Configuration Utility..
[↑ ↓]-Select [ESC]-Exit [ENTER]- Select Menu

Figure 10

Please press [ESC] to exit theICH9R RAID BIOS utility.

Now, you can proceed to install a SATA driver controller and the operating system.

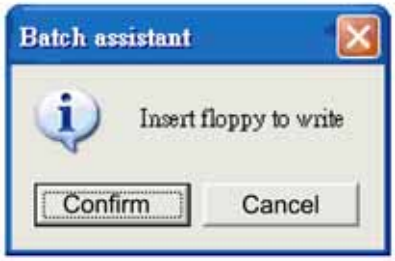
(4) Making a SATA Driver Disk

To install the operating system onto a serial ATA hard disk successfully, you need to install the SATA controller driver during the OS installation. Without the driver, the hard disk may not be recognized during the Windows setup process. First of all, please format a blank floppy disk. Secondly, follow up these steps below to produce a SATA driver disk.

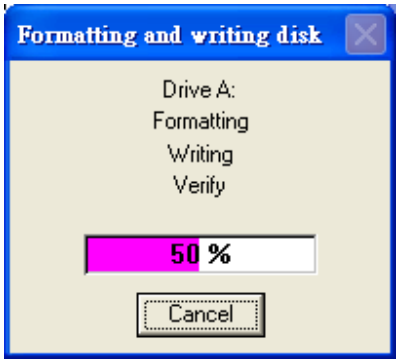
(4)-1 Users can insert the Driver CD and the formatted blank floppy disk in another system. And then, please execute the f6flpy32.exe file in the folder of the Driver CD.

Note *Please execute the f6flpy64.exe file, if installing 64-bit Windows Operating System.*

(4)-2 When this screen pops out, please click the "**CONFIRM**" button.



(4)-3 When the RAID Driver is written to the floppy disk, the SATA driver disk is completed.



Note *Please execute the f6flpy64.exe file, if installing 64-bit Windows Operating System.*

(5) Installing the SATA controller driver during the OS installation
Now, the SATA driver disk is ready, and BIOS settings configured, you can proceed to install Windows 2000/XP onto your SATA hard drive using the SATA driver. Here is an example for Windows XP installation.

(5)-1 Restart your system to boot the Windows 2000/XP Setup disk, and press F6 butoon button as soon as you see the message "*Press F6 if you need to install a 3rd party SCSI or RAID driver*" (as Figure 11). After pressing the F6 button, there will be a few moments for some files being loaded before next screen appears.

Figure 11

(5)-2 When you see the screen below, insert the floppy disk containing the SATA driver and press "*S*" (as Figure 12).

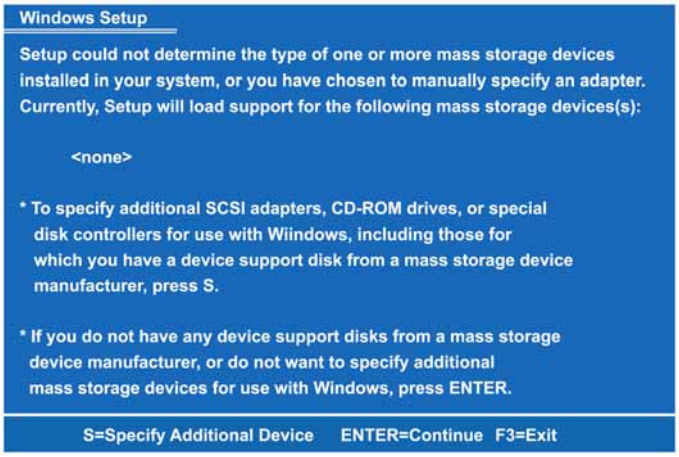

Windows Setup
Setup could not determine the type of one or more mass storage devices installed in your system, or you have chosen to manually specify an adapter. Currently, Setup will load support for the following mass storage devices(s):
<none>
* To specify additional SCSI adapters, CD-ROM drives, or special disk controllers for use with Wiindows, including those for which you have a device support disk from a mass storage device manufacturer, press S.
* If you do not have any device support disks from a mass storage device manufacturer, or do not want to specify additional mass storage devices for use with Windows, press ENTER.
S=Specify Additional Device ENTER=Continue F3=Exit

Figure 12

(5)-3 If the Setup correctly recognizes the driver of the floppy disk, a controller menu (as Figure 13) will appear below. Use the ARROW keys to select **Intel(R) 82801IR/ IHO SATA RAID Controller** and press ENTER**.** Then it will begin to load the SATA driver from the floppy disk.

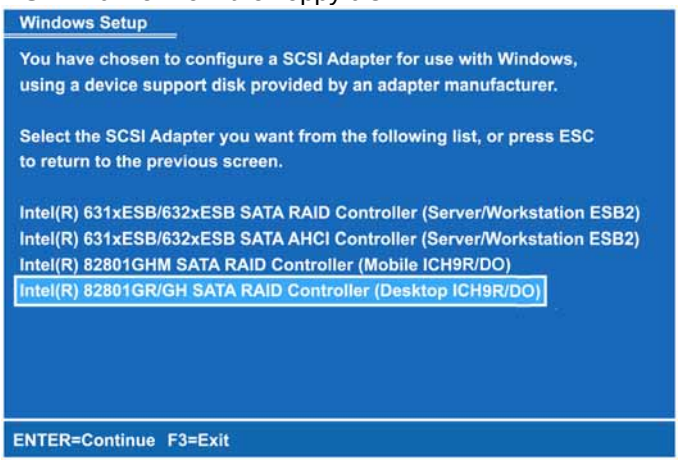
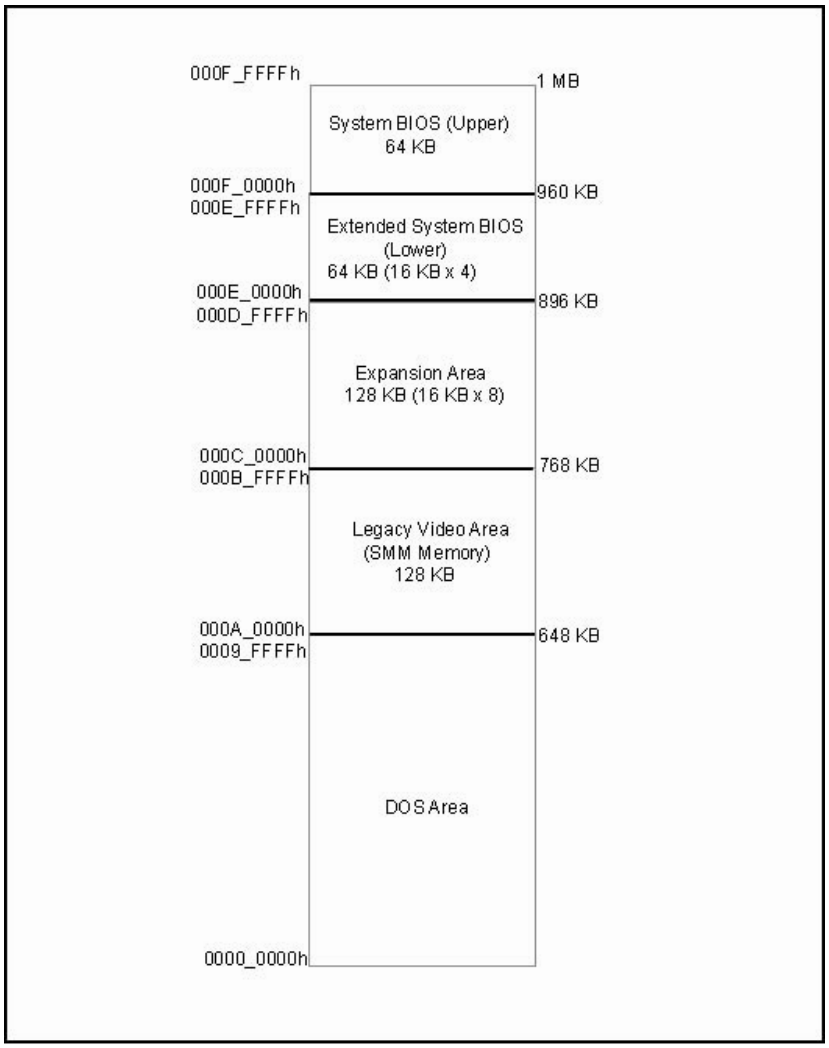

Windows Setup
You have chosen to configure a SCSI Adapter for use with Windows, using a device support disk provided by an adapter manufacturer.
Select the SCSI Adapter you want from the following list, or press ESC to return to the previous screen.
Intel(R) 631xESB/632xESB SATA RAID Controller (Server/Workstation ESB2)
Intel(R) 631xESB/632xESB SATA AHCI Controller (Server/Workstation ESB2)
Intel(R) 82801GHM SATA RAID Controller (Mobile ICH9R/DO)
Intel(R) 82801GR/GH SATA RAID Controller (Desktop ICH9R/DO)
ENTER=Continue F3=Exit

Figure 13

Note If a message on the screen saying that one or some file(s) cannot be found, please check the floppy disk or copy the correct SATA driver again from the driver CD.

A p p e n d i x D
Memory I/O Address


000F_FFFFh
1 MB
System BIOS (Upper)
64 KB
000F_0000h
000E_FFFFh
960 KB
Extended System BIOS
(Lower)
64 KB (16 KB x 4)
000E_0000h
000D_FFFFh
896 KB
Expansion Area
128 KB (16 KB x 8)
000C_0000h
000B_FFFFh
768 KB
Legacy Video Area
(SMM Memory)
128 KB
000A_0000h
0009_FFFFh
648 KB
DOS Area
0000_0000h

MEMO